MINING AND PETROLEUM STANDARD

AND

AMERICAN GAS-LIGHT JOURNAL.

Devoted to Mining, Petroleum, Gas, Water Supply, and Scientific Subjects Generally.

PUBLISHING OFFICE NO. 22 PINE STREET.

VOLUME IX—No. 4.
WHOLE No. 184

NEW YORK, FRIDAY, AUGUST 16, 1867.

$3 PER ANNUM
IN ADVANCE

Ashcroft's Steam Pressure Guage.

Ths necessity of providing some ready means of measuring, and at the same time indicating the pressure exerted by the steam evolved in steam boilers, has given rise to various devices for this purpose, of more or less value, according to the accuracy with which they operate, the simplicity of construction, durability and freedom from liability to obstruction and derangement to any of the parts.

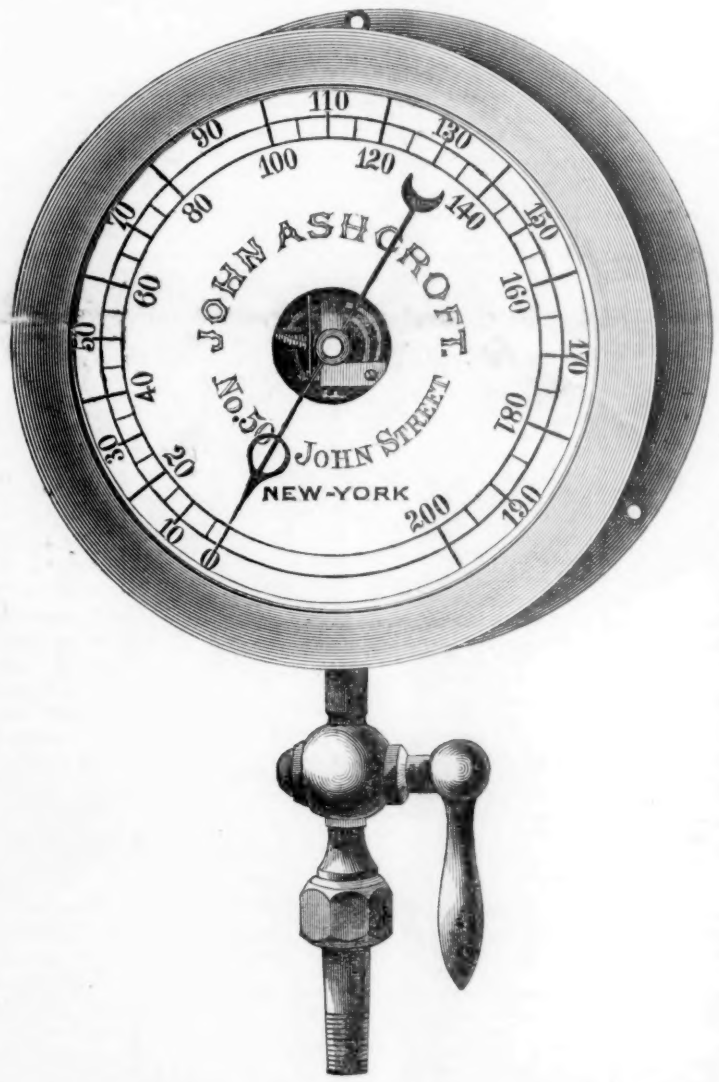
The value of an apparatus for this purpose that is reliable will be apparent to any one, when it is taken into consideration the great loss of life and property that may occur for the want of some infallible monitor of this description, which will always show at a glance, at any moment, the rate of pressure in the boiler.

Ashcroft's Steam Pressure Guage, herewith represented, is one of the most popular instruments known for this purpose, and has been simplified and improved until it is deemed perfect. It operates somewhat upon the principle of the Aneroid Baromoter, and is dependent upon the action of the pressure of steam upon an exhausted, or partially exhausted case or chamber of metal, which being flexible is so contrived as to convey indications of the slightest change in the boiler to a graduated dial, upon which figures are engraved or stamped, denoting the number of pounds pressure within the boiler.

The dial and case containing the mechanism is neat and ornamental, and can be placed in any conspicuous part of the engine-room or building, so long as it connects with the boiler by a steam pipe.

The engraving shows the dial and index, with the stop-cock and pipe to connect with the boiler.

John Ashcroft, 50 John street, manufactures and supplies these instruments, of whom further information may be obtained.



ASHCROFT'S STEAM PRESSURE GUAGE.

The Pantelegraph.

A new discovery, due to M. Labrigot, an official of the Paris telegraph office, completes M. Casselli's invention in a remarkable manner. Hitherto the pantelegraph could only transmit dispatches from a given point to another with which it was connected by a direct wire. Thus, for instance, the apparatus corresponded between Paris and Marseilles, or Paris and Lyons; but, owing to the interruption of the wire, a dispatch received at Marseilles rom Paris could not be transmitted to Strasburg, because the dispatch written in the sender's own hand had been reproduced at Marseilles, and the operation ended there. The words might of course be telegraphed to Strasburg by the ordinary telegraph, but the sender's own autograph could not reach that place. M. Lambrigot's invention remedies this defect. It has already been stated that the dispatch is written by the sender on a metallic paper, with thick ink and a thick pen, and that the copy is reproduced, say at Marseilles, in blue on a sheet saturated with a solution of cyanide of potassium. M. Lambrigot, in order to send the autograph further, reprints it in the following manner: He applies on the metallic surface a piece of tracing paper, so prepared as to produce Prussian blue by the contact of iron and a voltaic current. He thus obtains a copy of the autograph on the metallic sheet; this done, he passes over it a roller charged with a substance which immediately transforms the Prussian blue into a fatty substance, which will retain printing ink on the writing only, without soiling the rest of the paper. The autograph thus prepared is pressed on another metallic sheet, which receives the writing. A little litharge, a non-conducting substance, is then sprinkled upon the latter, and the autograph may then be transmitted anew. But as it thus comes out reversed, the copy at the other station is executed on thin paper, so that the dispatch may be read on the wrong side or back of the sheet. —*N. Y. Tilygrapher.*

Priming Preventer.

A simple and ingenious contrivance has been recently invented in France by M. Lugnes, for preventing priming, or the discharge of water with the steam, in the steam pipes of boilers. The apparatus consists of a short cylinder placed at the top of the horizontal part of a steam generator, with its axis disposed at right angles to that of the axis of the boiler. The steam pipe proceeding from the dome opens tangentially into the cylinder through one side. The outlet-pipe is forked, each branch opening into the cylinder in the center of the two ends thereof. A fourth opening made in the bottom of the surface of the cylinder, communicates with a pipe which descends to the bottom of the boiler.

When the cocks of the steam-pipe are opened, the steam entering the cylinder under pressure in a tangential direction, acquires a rapid rotatory or whirling motion, and escapes by the two central openings at the ends.

During this gyratory motion the drops of water conveyed along with the steam into the cylinder are, by centrifugal force, carried towards the sides and accumulate there. The water will, therefore, escape through the vertical pipe which proceeds from the bottom of the cylinder, and return to the bottom of the boiler; whilst the dry steam passes through the pipes fixed to the center of the cylinder ends, whence it is conveyed to the engine.—*American Artizan.*

—The immense spherical balloon nearly 70 feet in diameter, which makes hourly trips to the upper regi ons, is filled with hydrogen gas, made by decomposing steam by means of red-hot charcoal. By this process it is said the gas can be furnished at $2.75 per 1,000 cubic feet.

The Water Supply of Our Great Cities.

BY REV. JOHN W. MEARS.

[Published by order of the Water Committee of the Councils of Philadelphia.]

[CONCLUDED.]

How, now, shall we gather up and put into available form this body of water, which, at the depth of two feet, and covering over two hundred square miles of territory, is of no possible use to us, and which, coming sometimes in heavy storms, will hurry away from our reach, and in a few hours be irrecoverably lost. Here again Providence has been at work to aid us, in the configuration of the surface and the geological character of the region. If we take a position on the banks of the stream, at a point 26¾ miles northwest of the corner of Broad and Market streets, we shall notice that directly across the path of the creek, enormous masses of trap-rock have been forced up through the surrounding strata of sandstone, forming a range of hills four to five hundred feet above tide, and three hundred and fifty feet above the bed of the creek. Through a gate or gap in these rugged hills, the Perkiomen has found its way into the more level country below. A survey of the region shows that these hills, stretching nearly due east and west, form the southern boundary of the available water-shed of the stream; all the territory above them is of the geological character required for yielding pure water; below them an unfavorable change at once begins. An old copper mine, opened during the days of British rule, presents its mouth within a few rods of the southern face of the ridge, directly upon the bank of the creek. Above the ridge, nothing more injurious than a small quantity of limestone and iron ore can be found. The Skippack Creek, the first large one below the trap, already furnishes a much deteriorated quality of water.

Now, when we remember that trap-rock is one of the most impervious of all geological formations to water, we see that both in location and texture, this ridge of trap is a natural dike, behind whith the watters of the Perkiomen may be gathered; it being necessary for us only to supplement nature's work, by building a dam of sufficient height across the gap, through which the stream now flows. Had nature chosen to continue her trap-dike, without a break, across the country, we should have had a ready-made Loch Katrine—a body of water in fact, of nearly the same dimensions—within twenty miles of the city limits. She has come so near this beautiful and desirable result, as to invite us to complete her work, and Mr. Birkinbine proposes to the city to accept her invitation.

Running a dam across the gorge, say eleven hundred feet long, about the length of that at Fairmount, and sixty-five feet high from the lowest point or bed of the stream, we should soon collect a body of water covering an area of fifteen hundred acres. This lake would perform the part of an immense subsiding reservoir. Only the upper stratum of its waters, say twelve feet in depth, would be drawn off into the aqueduct. This twelve foot stratum, over an area of fifteen hundred acres, contains five thousand millions of gallons; a supply sufficient to last the city, at its present rate of demand, two hundred days. Once full, there might be a drought extending through two-thirds of the year, before the supply from this upper and purer stratum of the lake alone would be exhausted. To-day we have room for storing a *two days' supply* in our existing reservoirs.

A map prepared by the department, shows the proposed lake and immediately surrounding country. In its largest dimensions, the lake will be nearly six miles long and over one mile broad. The gorge in the trap-dike is at the point where the waters of the lake are represented as entering the main, flowing southward. The turnpike road, on the right bank, passes through the gorge, crosses what would be the bed of the lake at its deepest part, and rises to the level of the northern shore, at Zieglersville. The narrow arms of the lake would be navigable to a distance of over three miles from the dam on the western, and over eight miles on the eastern arm. If a small steamer were allowed to ply on its surface, as we believe under proper restrictions it might be, excursionists might enjoy the novelty of a trip of the most romantic character for over twelve miles upon an inland lake, within thirty miles of their doors. Huge strata of trap and sandstone would frown from the hillsides and through the wild forests lining its shores. A single wooded island would rise gently upon its bosom, and the palisade rocks, one hundred feet high, would loom up at different points on the long and narrow eastern arm of the lake. At suitable distances from the edge of the waters, summer residences of most desirable character might be built, and Perkiomen Lake might thus present a combination of useful and beautiful qualities, scarcely rivalled by any like body of water in the world.

And then, in years to come, when four or five times as great a population is comprised within our ample limits as at present; when Philadelphia has grown to the proportions which her favorable position, her manufacturing facilities, her healthfulness, good order and unyielding loyalty, promise to give her, and toward which she is moving with increasing energy and rapidity, Perkiomen Lake will be pouring through the proposed aqueduct, a daily supply of pure, undiscolored mountain water at the rate of sixty gallons for every man, woman and child, of the millions of inhabitants, every day of their lives; and the city will gather into the treasury, after interest and all expenses are met, and at rates not at all burdensome to the consumer, the enormous net revenue of over ten thousand dollars per day, or four million dollars per annum. The time might come when, with republican munificence, she could make her water supply almost as free to her citizens as the light or the air of heaven.

There was a discovery made and considerably noised abroad, some years ago, that Philadelphia is built upon gold. It was true, only the minute proportion of the precious metal in the soil would not pay the expense of extraction. Here we have a plan which is equal in money value, and infinitely superior in moral value, to the discovery of a real vein of gold running through the heart of the city; one which would contribute, if carried out, far more to the real prosperity of the city, and one, for the execution of which, posterity will be far more grateful to us of the present generation than if we should transport a section of Montana territory to their doors—a plan for furnishing an unfailing supply of pure water at a trifling cost to the people. The general supply of the cities of Christendom with abundant and good water, might also be accepted, especially in the light of Ezekiel's vision of the waters, (chapter xlvii.), as a millenial trait. At any rate, we may fairly quote and apply the final clause of the ninth verse: "Everything shall live whither the river cometh."

Gas Cannel and Coals.

Dr. Andrew Fife, Professor of Chemistry, King's College, Aberdeen, gives the following analysis of the comparative value of gas made from coals and cannel:

"A ton of English caking coal yields, on an average, at gas-works, 8,000 feet of gas; and though a larger quantity was given with my apparatus, yet we must take 8,000 as the quantity on a large scale. The value of the coal is taken as 1.

"The Wigan Cannel yielded 9,500 and 11,500; the value of the gas, bulk for bulk, being the same, viz., 1.85 to the former as 1. Now, taking into account the quantity of gas afforded, the value of the coals for yielding light, by the consumption of their gases, is as 2.23 for the one quantity, and 1.25 for the other. Taking the average, we state the value of English Cannel coal as 2.35, or say 2½ to Newcastle coal as 1."

We also give the following analysis of the Cannel raised by the Ince Hall Coal and Cannel Company, by John Leigh, M.R.C.I., Consulting Chemist to the Manchester Corporation Gas Works:

Carbonic Oxide and Aqueous Vapour....	1.53
Olefiant Gas and divers Hydro-Carbons..	8.50
Atmospheric Air...	4.32
Nitrogen.....	0.49
Hydrogen.....40.30	
Light Carburetted Hydrogen.....33.83	
Carbonic Acid..... .....11.35	
	100.02

Quantity of gas produced....11.673 cubic feet
Specific gravity of gas..... 5.20 " "
Coke produced from 1 ton of Cannel, 13 cwt. 13 lbs.

This Cannel is used by the chief gas works of this country, including London, Liverpool, Manchester and Birmingham; and by the principal foreign gas-works both on the continent and in North and South America. —*Export Coal Circular.*

COAL DISCOVERY NEAR NEW YORK CITY.—An extensive bed of coal, similar to that obtained from Mount Diablo, in California, has recently been discovered in Middlesex county, N. J., only twenty miles from New York. It is estimated that 4,000 tons of marketable coal can be taken from one acre of land, and delivered in New York at $3 per ton. Thirty thousand acres have been leased by a single company, which it is thought will yield an aggregate of eight millions of tons.

EUROPEAN PRODUCT OF PIG IRON.—The production of pig iron and steel in the various European countries, in 1865 is calculated as follows:

G't Britain	4,500,000	1,250	Norway,....	25,000	....	
France.....	1,225,000	30,000	Ger. States.	212,500	1,750	
Prussia....	515,000	34,250	Italy.....	37,500	750	
Belgium...	362,500	4,000	Spain.....	60,000	500	
Austria ...	337,500	21,350	Denmark..	15,000	...	
Russia	300,000	5,000				
Sweden...	225,000	6,500	Totals,	7,815,000		
					174,250	

Cost of the Sewerage Works in London.

The whole of these gigantic ironworks is throughout a masterpiece of skill, and considering the enormous difficulties to be overcome in the course of its construction, confers the highest credit and honor on the eminent engineer who designed and executed it. The cost of the main drainage, or intercepting sewer alone, some eighty-two miles in length, is about £4,250,000 sterling, which was raised by a 3d. rate levied on the metropolis, yielding £180,262 per annum; principle and interest to be paid off in forty years. To this must be added the expenditure lavished before on the immense network, some 1,300 miles in length, of main street sewers emptying into the intercepting conduits; also the enormous mileage of house or side-drain, the latter consisting nearly all of six-inch earthen pipe, whilst the main street sewers exhibit such a variety of sections and dimensions, as resulted from the conflicting opinions so long held by the General Board of Health and the various commissioners and engineers engaged in the construction of the works. Thus, some of these sewers are of an oval section, and large enough to admit the entrance of laborers, whilst others are pipes in conformity with the rules of the General Board of Health. In the city proper sewers are all of the former class, provided with street-gullies, for cleaning and ventilation. The depth of these street-gullies, or ventilating shafts, is seldom less than 10 ft., and often over thirty. These shafts, and a variety of costly contrivances for removing stoppages and effecting periodically thorough cleanings by flushing, form of course no small item in the capital spent on sewerage purposes. It is most difficult to get at anything like a correct estimate of the total cost of all the London sewerage works; but considering their enormous extent, the astounding depth of many excavations, the many difficulties always encountered in subterranean works on account of water springs, shoring up of defective foundations and houses, of removing or even rebuilding them—considering further the frequency of deep ventilating shafts, tunnels, and other expensive structures, the erection and maintenance of most extensive pumping stations it is estimated that the total cost of all the sewerage works cannot be far from thirty million pounds sterling.—*Krepp on the Sewerage Question.*

Utilisation of Blast-Furnace Gas.

The following is taken from the London *Mining Journal* of a recent date:

"A few days since one of our cotemporaries felicitated "the Black Country on the prospect of losing its unenviable title if a plan now carried out at Earl Granville's ironworks, near Hanley, was generally adopted." The plan referred to is not an absolute novelty, but it is probably carried out to greater perfection at Hanley than at any other place. The works at which it is in operation consist of a suite of four blast-furnaces, and the mouth of that which is nearest to the boilers is covered over with a movable cupola. The gas and smoke generated in the furnace are carried, by means of iron pipes, to the fire-places of the boilers, seven in number, and also to four kilns, used in the production of the hot-blast. The pipes discharge themselves just in front of a small bright fire, in passing over which their contents become kindled, and an almost constant stream of ignited gas rushes along beneath the boilers, and into the hot-air kilns. The consumption of the smoke prevents its escape up the chimney, with its attendant disagreeable effects upon the atmosphere; but we must not be thought uncharitable if we say that, probably, in the eyes of the noble proprietor and his managers, the saving of fuel is a far more important consideration. By utilizing the gas of one furnace, from 30 to 40 tons of slack per day are saved, and taking this and some minor economies into account, the saving is probably not less than 40£. per week. Preparations are now being made for converting, in a similar manner, another of the furnaces, and when that has been done no slack will be required, and the saving still more considerable, and will amount to something important upon every ton of iron made.

Chemistry, as Applied to the Manufacture of Coal Gas.

BY DR. FRANKLAND, F.R.S., F.C.S., ETC.

Professor of Chemistry at the Royal Institution.

REVISED AND EXTENDED FOR THE FOURTH EDITION,

BY DR. ATTFIELD, F.C.S.,

Director of the Laboratories of the Pharmaceutical Society of Great Britain.

[From "Clegg on the Manufacture of Coal Gas."]

Influence of other forces on Chemical Affinity.—Chemical affinity is greatly modified and controlled by the forces of heat, light, electricity and cohesion. The modifications effected by heat and cohesion are alone of interest to the gas manufacturer. It is by the mutual action of these two antagonistic forces, which have been appropriately termed the attractive and repulsive forces, that the state of aggregation of all matter is determined; a preponderence of the cohesive force producing the solid condition of matter; the equilibrium of the two fores, the liquid; and an access of the repulsive force, the gaseous or vaporous condition. Now as chemical affinity acts only at insensible distances—in other words, as each atom of the combining substances must be in intimate contact before the chemical force can be exerted between them—it will be obvious that the physical state of a body must considerably modify the action of chemical affinity. Between solids, for instance, where the atoms are congregated together in a hard mass, affinity can rarely be exerted, since the mobility of the atoms is prevented, and the points of contact between the two substances are so few. In gases, the repulsion which exists between the atoms, preventing their contact, is also generally fatal to combination. The liquid state is therefore the most favorable to chemical union. The ultimate particles of a liquid are sufficiently mobile to allow it to mix intimately with the substance with which we wish it to combine, while they are sufficiently approximated to be within the sphere of chemical attraction. The old axiom of the alchemists still obtains, "Corporan on agunt nisi sint soluta."

The effects of heat in modifying chemical affinity vary according to the nature of the substances which come under its influence. Usually it appears to increase the intensity of the chemical force and thus favors combination, unless its repulsive action drives the particles of the combining bodies to a greater distance from each other than that at which chemical attraction can exert its influence. Thus the affinity of carbon for oxygen is so small at the ordinary temperature, that these elements may remain in contact for ages without evincing the slightest tendency to combine; but if the temperature be raised to dull redness, combination begins to take place, and at still more elevated temperatures the affinity between them becomes so intense, that carbon can, under these circumstances, withdraw oxygen from almost every compound containing that element.

Of the substances contained in Coal Gas, or which are concerned in its generation and combustion.—These are:

Oxygen.	Light Carburretted Hydrogen.
Hydrogen.	Olefiant Gas.
Nitrogen.	Acetylene.
Carbon.	Hydrocarbons.
Carbonic Oxide.	Sulphur.
Carbonic Acid.	Bisulphide of Carbon and Organic Sulphur Compounds.
Water.	Sulphuretted Hydrogen.
Ammonia.	Cyanogen and Solphocyanogen.

The nature and properties of these elements and compounds are as follows:

Oxygen.—This element exists in the free state as a colorless, invisible and inodorous gas, very sparingly soluble in water, and which has hitherto resisted all attempts to liquify it by cold or pressure. In this condition it is evolved from the leaves of plants under the influence of light, and constitutes about one fifth of the bulk of our atmosphere. By far the largest amount of oxygen however exists in combination with other elements; thus, eight out of every nine tons of water are pure oxygen, and it forms at least one-third of the total weight of the mineral crust of our globe. It is therefore the most abundant of all elements. Oxygen gas is heavier than atmospheric air; 100 cubic inches at 60° Fahr. and 30 inches barometric pressure weighing 34·193 grains, whilst 100 cubic inches of the latter weigh only 31·0117 grains. Since atmospheric air is taken as unity when comparing the density of gases, the specific gravity of oxygen is 1·1026. It eminently supports combustion, all combustible bodies when introduced into it burning much more vividly than in common air; indeed the property of supporting combustion which common air possesses, is owing to the presence of this gas.

The union of oxygen with other elements is always attended by an elevation of temperature. When the union is very slow, as in the rusting of iron, the heat developed cannot be appreciated; but when combination is rapidly effected, it is attended with the phenomenon of light as well as heat, as in ordinary combustion.

It was formerly thought that the heat developed during combustion was always proportionate to the quantity of oxygen consumed; but recent experiments have not confirmed this opinion. We are indebted to Berthier for an expeditious process for ascertaining the value of a combustible founded on this fact. He mixes the substance to be tested with several times its weight of oxide of lead (litharge), and exposes the mixture in a crucible to a heat sufficient to fuse it. Oxide of lead is composed of oxygen and lead, in the proportion of 16 parts by weight of the former to 208 of the latter. At a red heat the combustible matter seizes upon the oxygen and reduces the lead to a metallic state. This melts and collects in the form of n button at the bottom of the crucible. As we have shown that the proportions in which bodies unite are always uniform, it is evident that for every portion of oxygen consumed a certain portion of lead will be reduced, so that the effective combustible matter in the compound examined will be in due proportion to the weight of the button of lead. This process is not entirely free from objections, but sufficiently so for many practical purposes.

Oxygen is usually a constituent of coal-gas as supplied to the consumer, owing to unavoidable leakages and the introduction of atmospheric air into the retorts and purifiers when these vessels are opened. Its presence is highly injurious to the illuminating power of the gas, as will be presently noticed; and as there is no practicable means of removing it from the gas, its introduction ought to be guarded against as much as possible.

Hydrogen.—This element, like oxygen, is in the free state a colorless, invisible and inodorous gas, scarcely soluble in water. It is very rarely met with in nature uncombined; but has lately been detected in the free state in the gases which issue from volcanoes. In combination it constitutes one-ninth of the total weight of the waters of our globe, and and also enters largely into the composition of animals and vegetables, and of substances derived from them, as oils, peat, coal and bitumen. Its amount in coal-gas is liable to much variation.

Hydrogen gas is generated in abundance nearly pure when steam is passed over iron, zinc, and several other metals in a fine state of division at a full red heat. Mixed with carbonic oxide and carbonic acid gases, it is also generated in large quantity when steam is passed over charcoal, coke, or other carbonaceous substances at a red heat. In all these cases the watery vapor is decomposed, its hydrogen being liberated, whilst its oxygen unites with the metal or carbon, forming in the first case a solid non-volatile oxide, which incrusts the pure metal and soon stops further action; in the second case a gaseous oxide of carbon is generated and passes off along with the hydrogen, thus leaving the carbon freely exposed to the further action of the watery vapor. That portion of the steam which is converted into hydrogen and carbonic ovide yields its own volume of each of these gases; and that portion which forms hydrogen and carbonic acid affords its own volume of hydrogen and half its own volume of carbonic acid. The amount of watery vapor which undergoes the latter decomposition decreases as the temperature at which the operation is conducted increases. At a white heat scarcely a trace of carbonic acid is produced.

Hydrogen is the lightest of all known bodies, its specific gravity being only 0691; 100 cubic inches at 60° Fahr. and 30 inches barometric pressure weigh only 2·1371 grains. It has a powerful affinity for oxygen, but developes scarcely any light during combustion; the heat produced is, however, so great, that when solid substances, such as lime, magnesia, or platinum, are held in the flame considerable light is emitted. The product of its combustion is watery vapor, which condenses upon cold surfaces held above the flame.

One cubic foot of hydrogen at 60° Fahr. and thirty inches barometric pressure, consumes half a cubic foot of oxygen, generates one cubic foot of watery vapor, and affords heat capable of raising the temperature of 1 lb. 13 oz. of water, from 32° Fahr. to 212° Fahr.; or the temperature of a room containing 2,500 cubic feet of air from 60° Fahr. to 66·4° Fahr.

(To be continued.)

Acetylene—Curious Experiments.

A colorless gas, consisting of two equivalents each of carbon and hydrogen, is contained in small quantities in coal gas, and is supposed to have been the cause of certain mysterious and hitherto unaccountable gas explosions. It may be separated from the coal gas by passing the latter through a solution of ammonia-sulphate of copper, precipitating a reddish-brown deposit of acetylide of copper. This being very explosive, igniting with slight friction, is supposed to have been the cause of several explosions which have occurred in moving copper gas pipes and in altering meters where the brass work had been much in contact with the gas, and a deposit of acetylide of copper might naturally have been formed. It is a curious fact that if chlorine gas is turned into a jar of acetylene gas, even in darkness, an explosion will ensue; but not so if the acetylene be turned into the chlorine, unless a moderate degree of light be present. In the latter case, the chlorine unites with the hydrogen, setting the carbon free, so that the vessel which held a mixture of colorless gases, is instantly filled with a mass of inky black smoke, giving the jar the appearance of patent leather. These observations are derived from a recent lecture by Professor Frankland.

Miscellaneous Items.

—It is said that railroad men lately visiting Colorado have proposed building and stocking a branch to Golden City and Denver, if the Colorado people will do the grading. They estimate it at $600 000. Gilpin county in which Central City is situated, proposes to contribute $200,000 of this.

—The quantity of paper used every year in England represents a weight of about 220,000,000 pounds. France uses 195,000,000 pounds, while the United States of America, with a much smaller population, consumes more paper than England and France put together, viz., 440,000,000 pounds.

—Several "bricks" of Montana gold have recently been received in St. Louis. Among these is one valued at $9,600; two "bricks," one weighing 452 and the other 453 ounces, valued respectively at $7,769.47, and the latter at $7,775.43, each containing 83-100th of pure gold. These bricks are the result of a lucky venture in the mines by a St. Louis printer.

—Glycerine is found to be an excellent material for smearing plaster of paris molds before taking a cast. It is easily applied with a brush, and after the cast has set, it readily separates without the least danger of splintering or cracking. It is said to possess many recommendations over the soap and water usually employed for thot purpose.

Gas and Water Pipes.—An English civil engineer, named Ormsby, recently stated that the juxtaposition of water pipes with gas pipes underground is highly detrimental to the quality of the water, and gave a remarkable instance to prove this assertion. He says that he has it on the authority of the engineer of the New River Company that, on applying a light to some of the water pipes which he had to inspect, ignition was caused, as if they contained gas instead of water.

—The Diamond Drill is being successfully and economically used, on a large scale, at the tunnel of Tarase, on the Bourbonais Railway, in France. It is worked by water power, and three and a quarter feet in depth per hour is drilled in very hard rock. The cheap diamonds from Borneo are used, with very little destructive effect to the drill or gems.

—The inventors of popular toys get quick returns. The inventor of the common street toy known as the "returning ball," is said to have realized $100,000; the "always wound up top" realized $40,000. The inventor of the "walking doll," which was so fashionable a few years ago, made $75,000 by patent. The dancing "Jim Crow" toy, introduced a few years ago, was invented by an invalid boy, and won a fortune.

—The two reservoirs for the new water works in Oswego, N. Y., on each side of the river, were completed lately, each having a capacity of 7,500,000 gallons. The distributive pipe is now being laid throughout the city. The contractor uses a method of digging the trenches for the pipe. With four horses and twenty-four men he can dig 1800 feet of trench in a day, doing the work of 100 men.

Study on Coal Tars and their Products.

EXHIBITED IN 1867.

BY PROFESSOR H. DUSSAUCE, Chemist.

[Translated for the AMERICAN GAS-LIGHT JOURNAL from "Studies on the Exposition of 1867," published by EUG. LACROIX, 15 Quais Malaquais, Paris.]

I. PRODUCTION OF THE TAR.

All our readers know that lighting gas is produced by the distillation of coal in cast iron or in refractory earthen retorts; boghead, cannel coal, rosin, etc., and other substances rich in hydrocarbons are also used, but their applications are limited; for the subject which engage us now, the distillation of coal is the only important one, as the tar it produces is the richest in substances proper to manufacture colors.

Indeed, the distillation of coal does not produce only gas and coke; the gas in evolving deposits tar, ammoniacal waters used to manufacture ammonia and its salts; lastly, all coals containing more or less sulphur, the discoveries in chemistry have permitted to free the gas of it, and reconstitute it in a free state. The cyanides produced during the distillation are also collected. These products are, it is true, in small quantities, and it is only large manufactures which can exploit them advantageously.

As for the other products from the distillation of coal such as gas, coke, tar, ammoniacal waters, they are obtained in different proportions according to the value and quality of the coal. The proportion of tar varies according to the locality; we have seen, for example, Prussian coals giving as high as seven per cent. of a product very rich in light hydrocarbons, and some coals of Saint Etienne, distilled in the same way and in the same conditions of temperature, giving only four per cent of a tar much less rich in benzine.

In England some coals produce only four per cent. of tar, others nearly similar to cannel coal give larger proportions. These differences are evidently due to the quantity of hydrogen contained in the coal, this element being absolutely necessary to the production of the hydrocarbons which enter in the composition of the tar.

Manufacturers who, while making good coke, will produce tar, ought to consider the nature and quality of the coal they use, the proportions of gas and coke varying as that of tar.

We shall give, for example, the results obtained by a commission composed of M. M. Chevreul, Regnault, Peligot and Morin, on the coals of Anzin and Mons.

100 kilogrammes (1) of coal have produced

Gas.....	22	cub. metres (2)	94
Coke.....	75	kilogrammes	46
Tar.....	6	"	73
Ammoniacal waters....	7	"	81

In practice they generally calculate on five or six per cent. of tar, but this amount depends also on the method of distillation. Thus, at a low temperature, continued for a long time, the production of tar is larger; with a very high temperature at the beginning of the distillation more gas is produced. A high temperature not only diminishes the proportion of tar, but modifies its quality and value.

For gas manufacturers, this product being the principal one they wish to obtain, all their endeavors is to increase the amount; but when the purpose is to manufacture tar and hydrocarbons, the manufacturer must remember that a slow distillation and a moderate temperature, at least in the beginning of the operation, produces the largest quantity of tar. This fact is true not only for coal, but also for shales, peat, wood, etc.

To resume, these five or six per cent. of tar form the crude material of numerous industries, of which we shall speak hereafter.

In practice those five or six per cent. represent considerable quantities. Thus, a single manufactory known by the name of the Parisian Company, use annually 440,000 tons of coal, which at five per cent. of tar, represent twenty-two millions of kilogrammes of tar.

About eight years ago an ingenious chemist, M. Knab, had foreseen the important part tar would play in the arts; he was not mistaken, for one year after the price of benzine increased much, and he was the first who tried to collect the tar produced in the fabrication of coke and gas. At that time all the coke furnaces burned not only their gas, but also all the other accessory products. The problem was to make those furnaces work as gas retorts, and in this he was successful. Ovens containing six thousand kilogrammes of coal have been in operation for the last twelve years, producing gas, tar, ammoniacal waters and metallurgic coke. But gas being the principal product, the ovens are heated as retorts by special furnaces in which the coke is burned.

But in mining exploitations where the gas has no value, this gas is applied to the heating of the ovens, after the extraction of all the accessory products. This process is applied on a large scale in France in the department of La Loire. The manufacture of M. M. Carves Erla for nine years carbonized yearly 80,000 tons of coal, and while collecting the tar and ammoniacal waters, they produce a coke of a very good quality, which is sold from $4 to $6 a ton.

According to the best statistics, besides gas works, France alone carbonizes more than three millions of tons of coal; calculating a production of four per cent. of tar, we see for future use a spring of 120 millions of kilogrammes of tar.

In England the production will be larger; consequently, there is no fear of want of crude material for the industries using tar.

History and Applications of Coal Tar and its Products.

The first application made from coal tar was to use it as a paint, but for this purpose it is inferior to wood tar; to be rid of it, gas works used to employ it to heat their retorts. The process, to burn it completely was to introduce it in a thin stream into a hearth without a grate, surrounded with refractory bricks, constantly kept at a white heat, while double currents of air rendering the cumbustion more perfect. The calorific capacity of tar compared with coal was : : $1\frac{1}{2}$: 1. We see that by being thus employed the tar was not giving a profit of more than 30 to 35 cents per 100 lbs.

Eighteen years ago M. Popelin Ducarre imagined, with this tar and charcoal dust, to reconstitute a new coal in regular cylindrical pieces, which yet rival with charcoal. That material is now produced on a very large scale.

At about the same time, in England and Belgium, a factitious coal was made by mixnig under a great pressure, six or eight per cent. of tar with the coal dust from the mines.

We see that the solid part of tar has found important applications which make sure for a long time of its entire use. On the contrary the oily products had no important uses; the first and principal one was to apply them to the fabrication of lamp black. However, it did not take long to ascertain that those oils contained a great many distinct products, and at first industry guided by chemistry, distinguished the principal products—the benzine or volatile oil of tar, and phenic acid saponifiable by alkalies. The benzine, by its properties of dissolving fatty bodies, found an employ in the domestic economy for cleaning cloths, dissolving India rubber, etc.

Another application of benzine is in the imitation of natural perfumes. Thus, pure benzine, treated with concentrated nitric acid, produces nitro-benzine, the odor of which is similar to the oil of bitter almonds. This nitro-benzine, called also oil of mirbane, is used to perfume soaps.

While benzine was cheap it was thought to use it to increase the lighting power of gas. Every one knows that by passing a gas through a volatile oil, it gives to that gas a higher lighting power, on account of a little hydrocarbon carried off by the gas. But benzine having now more beneficial uses, this process is not used.

As to the phenic acid, this product, similar to the creosote extracted from wood, its preservative and antiseptic properties attracted the attention of manufacturers. This acid is abundant in the oils less volatile than benzine. All these secondary products called heavy oils—very complex compounds—were used at first in England for the injection of wood. By this process the preservation of wood is perfect, and these oils have not the inconvenience of the sulphate of copper to render the wood brittle. From the whole of these heavy oils, in which phenic acid is in the minority, it did not take long to exhaust it pure enough to produce picric acid, bright yellow color, with a great tinctorial power, since one pound of this pure acid is sufficient to dye one thousand pounds of silk.

Such were, not twenty years ago, the applications of tar, but this industry, with the help of science, soon produced those colors of organic origin, in such a state of purity, that they are crystalized and so concentrated, that like musk, they could be employed as an example of the infinite divisibility of the matter. Thus, one pound of picric acid could dye one thousand pounds of silk, and the futschine is yet visible in a solution at one-tenth of amillion; that is, one grain of futschine dissolved in 166 gallons of water, gives an apparent shade.

These beautiful products are admirably represented, first by France, who could claim the industrial discovery of the following colors:

1. The picric acid used in dyeing, for the first time, at Lyons, in 1847.

2. The futschine, a fine violet pink, discovered by Verguin, which, five years ago cost from $80 to $100 a kilogramme, now costs from $6 to $8.

3. The fine violets derived from futschine.

4. The dark and violet blues made by M. M. Girard and Laire, to whom the industry of colors owes numerous improvements.

5. The splendid emerald green discovered by M. Usebe, in 1862.

The English section has a very fine exposition, and it was in England at first that Perkins produced directly, by the oxidation of aniline, that blue violet known by the name of the inventor.

The aniline black discovered by Lightfoot, is also due to England; and Hoffmann, one of the promoters of that industry, prepare a most magnificent violet, but unfortunately, that color is not solid.

M M. Poirier and Chapot, from Paris, have taken a patent for a violet as fine as Hoffmann's, but the preparation of which is more economical. Prussia, Germany, Belgium and Switzerland, have also fine specimens of colors. Each year brings an increase in the number of colors manufactured from coal tar. Phenic acid, besides picric acid is used to prepare rosolic acid and fine pink shades, and naphthaline, the most abundant product, also furnishes some.

Pure phenic acid, besides its well known antiseptic properties, begins to play an important part in therapeutic. Then, the researches on this product have been numerous, and now it is obtained very pure, white and crystalized. Sometime ago it was is used in England as a disinfecting agent; during the last cattle plague it was employed to disinfect stables, farms, cars, etc In France it is used to preserve a human corpse.

To resume, we recapitulate the immense progress realized by industrial chemistry in a few years, with a product nearly unknown before the introduction of gas, and for sometime without value.

1st. Period—unknown before 1815.
2nd. First application as a paint of coal tar.
3rd. Application of coal tar for heating retorts.
4th. Application for manufacturing fictitious asphaltum.
5th. Application of the oils to the fabrication of lamp black.
6th. Application of the tar to the fabrication of agglomerated charcoal.
7th. Preservation of wood by heavy oils.
8th. Application of benzine for cleaning, etc.
9th. Application of benzine for manufacturing oil of mirbane, a substitute for the oil of bitter almonds.
10th. Benzine used to increase the lighting power of gas.
11th. Transformation of phenic acid into picric acid, a yellow coloring matter.
12th. Discovery by Perkins of the violet of that name.
13th. Application of the heavy oils to lighting, by M. Douy, to painting, etc.
14th. Successive discovery of the bright aniline dyes—futschine or red, violets of futschine, dark and violet blues, light blue, black, gilded yellows, browns, purple, light green, Hoffman's and Poirier's violets.
15th. Pure phenic acid and its applications in medicine.

After this brief history of an industry which each year brings a progress, we must give some details on the treatment of coal tars, that is, on the separation of the different products used in the above industries.

(To be continued.)

(1). The Kilogramme—2 lbs. 3½ ounces.
(2). The cubic metre—35.31 English feet.

Gas Machines and Gasoline.

ACTION OF THE NEW YORK BOARD OF UNDERWRITERS.

The following important report of the Committee on the subject of Gas Machines and Gasoline was considered and unanimously agreed to by the New York Board of Fire Underwriters, on the 16th of July:

The undersigned having been appointed on various committees on gas machines—general and particular—and upon the use of benzine, gasoline, and other kindred inflammable liquids for domestic and other purposes, including the use of such materials for supercarburetting the coal gas in common use, report:

That they find all of the liquids referred to to be in a high degree inflammable and dangerous, and requiring the extremest caution in their use.

They are of the opinion that in no case should any of these materials be permitted to be used in any building for the purpose of creating a gas or vapor for illuminating purposes, unless at a greatly increased charge of insuring; but that in all cases both the reservoirs containing the supply and the machine used for converting it into gas should be so far removed from the property insured as to prevent all hazard of burning from the use of the material in its liquid form.

The committee is satisfied that there is no danger of explosions taking place from the burning of the materials referred to even if fire should be communicated to them.

They are also satisfied that the use of the gas or vapor for illuminating purposes where introduced into the premises in the same manner as ordinary gas is introduced, causes no material increase of hazand beyond that caused by the use of any common gas provided the pipes are supplied with suitable means of

receiving and removing whatever may, under any circumstances, be condensed in the pipes.

In the judgment of the committee it is proper to take into consideration, in estimating the hazard of using the gas or vapor referred to, that it will take the place of moveable lights, which are always dangerous, and especially so, when such lights are of the kerosene oil in the state of adulteration common to it.

The question of how remote the gas-house or vault containing the reservoir and machine should be from the insured premises, will depend upon circumstances. When the gas-house or vault is used for no other purpose than that of holding these articles, a distance of 50 feet is abundantly sufficient, and under some circumstances a nearer proximity to the building insured would not be attached with any increase of hazard.

The committee are of opinion that in the case of all manufactories and of all large structures, such as hotels and public buildings, the distance of 50 feet at least, should be rigidly insisted upon.

There should also in all cases be placed in the pipes, at the entrance into the insured building, a stop cock, so that in case of any emergency the flow of gas may be shut off.

The committee state that their views respecting the necessity of keeping the material in its liquid form out of the building, are in accordance with those of a number of the proprietors of gas machines, whose experience has led them to the same conclusion.

It is admitted that so long as the material remains in the machine, and until converted into an illuminating vapor, no risks attend it; but there *is* a hazard connected with filling the machine—with drawing off any of the fluid of a non-evaporable character, or for repairs, and also from liability to accident from leaking or from defective construction of the machine. The committee are unable to discover any such difference in the various materials used for producing gas as to justify them in making any exception in favor of either—the material should be always excluded from the insured buildings except as hereinafter provided respecting carburetting machines.

The fact that any material, used without the application of fire heat creating an illuminating gas, must be exceedingly volatile and highly inflammable and therefore very dangerous, seems too obvious to need argument.

The committee think it important to require precautions no less complete, in the use of the materials named, or of any of sufficiently analogous character to effect the object sought for the purpose of super-carburetting common gas. The fact that it is desirable to place the carburetter near the gas meter renders it important to find some safe mode by which this can be accomplished and the committee believe that the carburetter being a comparatively small article, may with safety be placed in an ordinary cellar provided it is enclosed in substantial brick work made perfectly tight, having an outlet by means of an iron pipe from the bottom to carry off any overflow or leakage to the sewer or other proper place and to be filled from outside the building, by means of an iron pipe, this pipe as well as that connecting the apparatus with the meter, and the service pipe to be securely and closely masoned in the brick work which shall be sufficiently substantial to resist any accidental force that can be applied to it.

The use of gasoline or of any other kindred article for saturating the wicks of what are known as light-house, oil lamps or gas lamps is a source of vast danger not only from the great liability of the lamps to explode, but also from the necessity of handling the gasoline, very frequently for the purpose of saturating the wicks, and consequently of having a supply of the inflammable material on hand and almost always handled by inexperienced and careless persons.

The use of benzine in mixing paints and in other business as well as when used for domestic purposes in dwellings, is attended with danger, and while its use in dwellings cannot be altogether prohibited, the committee think it important by some effective means as through the public press or otherwise to call the attention of those using it to the extreme danger attending it, and especially when exposed to any neighbouring fire or light.

While the committee are alive to the danger of using kerosene in the condition of adulteration with naptha, benzine or gasoline, in which it is frequently found, they are not prepared to suggest any action calculated entirely to correct the evil.

The increased value of the lighter portions of petroleum above spoken of, in consequence of the ability to use them in automatic gas machines, will tend to mitigate the evil by enhancing the value of such portions, and to the degree that adulteration becomes less profitable it will diminish.

It should be enjoined upon all who use any product of petroleum for lighting their premises, never to fill a lamp or do anything else with such product except during the hours of daylight, and then never in the vicinity of a fire, and also when purchasing kerosene to ascertain carefully what is its fire test, and unless that be 110 degrees or over, to reject and condemn it as they would an incendiary with torch in hand.

In closing, the undersigned would state that they constituted the membership of three separate committees appointed by the Board on the various subjects reported upon. That the several chairmen of these committees called a joint meeting of the whole, and at such meeting unanimously agreed to unite the whole into one committee, of which Mr. Oakley, of the Howard Insurance Company was appointed chairman.

All of which is respectfully submitted.

HENRY A. OAKLEY, Chairman.
GEO. T. HOPE,
D. A. HEALD,
LINDLEY MURRAY,
A. F. HASTINGS,
R. GARRIQUE,
R. F. MASON,
E. B. FELLOWS,
J. L. DOUGLAS.

Carbolic Acid.

There is little doubt that this article was used by the early Egyptians in some crude form in their process of embalming. Its full value, however, is not yet appreciated. Upon the experience of Lemaine and Crookes we may trust it to destroy almost all kinds of animalcules and insects when applied in the form of vapor. It is not strong enough however in this form to act injuriously on animals larger than mice. An aqueous solution added to water, in which a small fish was swimming, proved fatal in a few minutes. Flies and mosquitoes have an intense aversion to the vapor of carbolic acid, a fact which thrifty housewives and all who find themselves annoyed by these insects will probably not forget. A small quantity exposed to the air in a cup will keep a room entirely free from these little household pests. It also banishes cockroaches bed-bugs, ants and vermin of all kinds, merely by making a weak solution of the carbolic acid and water and washing the infested places.

On the fœtid gases produced by putrefaction carbolic acid seems to have very little effect; but it attacks their causes and puts organic matter in such a state that it never reacquires its tendency to putrify. This is curiously shown in some experiments recently made by Mr. Crookes. Some meat was hung up in the air until the odor of putrefaction was strong. It was then divided into two pieces, one of which was soaked in chloride of lime solution, and then washed and hung up again. The offensive smell was entirely gone. The other piece was soaked in water containing one per cent. of carbolic acid. It was then dried and hung up. In two days time the offensive smell had been replaced by a pure but faint odor of the acid. After a few weeks the piece of meat that had been deodorized by chloride of lime smelt as offensively as it did at first, while the piece treated with carbolic acid had no offensive odor whatever. It was then hung up and examined at the end of a month. No change had taken place. Another experiment shows its power to prevent putrefaction in a still more striking manner. A piece of meat was soaked for one hour in water containing one per cent. of carbolic acid. It was then wrapped in paper and hung up in a sitting-room in which there was fire almost daily. At the end of ten weeks it had dried up to about one-fourth its original size, but looked and smelled perfectly good and fresh, a very faint odor of carbolic acid being all that was perceptible. It was soaked for twenty-four hours in water and then stewed with appropriate condiments and eaten. It was perfectly sweet and scarcely distinguishablh from fresh meat, except by possessing a very faint flavor of carbolic acid, not strong enough to be unpleasant.

Carbolic acid, because of its wonderfully destructive power over minute animal organisms, and because of the immediateness with which it arrests putrefaction, may be relied upon to destroy the infection of cholera. The cattle plague yields to it, and Dr. Angus Smith has proved that the putrefactive decomposition of soils which produces malaria, does not take place in presence of very minute quantities of this acid. On tracts of land to which sewage, disinfected with carbolic acid, has been applied, obnoxious insects disappear, vegetation becomes healthy and luxuriant, the sheep are free from foot-rot, and potatoes from disease. It is never unpleasant or injurious to cattle. They lick the woodwork of their stalls after it has been sprinkled with diluted acid, and readily drink water in which it has been dissolved. In his report to the Royal Commission for inquiring into the origin and nature of the cattle plague, Mr. Crookes, whom we have already mentioned, and upon whose experince we have largely drawn, affirms that he has never met with a single instance in which the plague has spread on a farm where this acid has been freely used. Vaccine virus, treated with carbolic acid, loses its virtue at once. We may conclude from this that it will destroy small pox poison. Some experiments made by Dr. J. P. Loines, of this city, prove that chlorine has no such effect. He immersed the vaccine crust in chlorine of sufficient strength to be irrespirable, and also to destroy the cork which was used in the bottle. After a week of this treatment the crust was found to produce perfect vaccine vesicles.

The Croton Aqueduct.

It will be well worth a visit to the beautiful villages of Carmansville and Manhattanville to take a peep at the works which are being carried on there under the Croton Board, so as to have the water from their aqueduct conducted to all the places of importance in the north part of the city, and to every district where the population guarantees the requisite expenditure. It will be a great desideratum to Carmanville, Fort Washington, the Heights, Manhattanville, etc., supplying as it will, plenty of fresh water at these places. The preparations for erecting the engine house and boilers will soon be perfected; and the Croton Board is, through their engineer, pushing on the work well. Messrs. Stevens, Darragh and Craven are the chief commissioners. Capt. Edick of the Croton Board, is chief inspector of the new reservoir.

The engine house will convey water to the great tower, and through that medium to all the highest points of the north end of the city. Messrs. Brown & Witherall, in erecting this tower feel confident of giving every satisfaction. From the tower water can be forced to Washington Heights, Fort Washington, and all the other places in the district where it is necessary to send it. The water will be heaved between three and four hundred feet from the engine house to the tower. This will be a work of much importance to the public comfort.

There will be two new gate houses, the one at the east and the other at the west end of the reservoir. They will be erected by Messrs. Roach and Jenkins, the builders of the reservoir. The gate houses will be plain and substantial, though of chaste design.

The inside walls of the reservoir have been commenced, and are being firmly constructed with solid stone and cement. Capt. Edick superintends this as well as the general survey of the work. The machinist, the mason, the carpenter, the blaster of rocks, the hewer of wood and the drawer of water, are all working like so many honest men to finish this beautiful improvement to the city of New York. The inside wall of the reservoir, called the slope wall, will be very strong, and those who have seen it state that it is the best of the kind ever built in the State or United States. When the reservoir is finished, the gate houses built, and the tower in complete working order, then the Croton Board will have done their duty to the north end of the city.—*N. Y. Herald.*

Coal Market.

NEW YORK, Aug. 15th, 1867.

The only *changes* which we have to report since the last issue of the GAS LIGHT JOURNAL, are—

Little Glace Bay to New York		$3.00
Lingan	" "	3.37½
Pieton	" Providence	2.75
Sydney	" New York	3.25

The freight quoted in our last to "Warlham" should have read "Wareham," (Mass.)

"AN ITEM OF INTEREST."—Computation of interest at 7.30 per cent. is a difficult operation for people who have not observed that 730 is twice 365, and that 7.30 per cent. per annum is accordingly two cents a day on every hundred dollars.

PATENT CLAIMS.

Pertaining to Gas, Mining, Petroleum, Water etc.

FOR THE TWO WEEKS ENDING AUGUST 16, 1867.

67,161.—Gas-pipe Joint.—Charles Bruso, Jun., Worcester, Mass.

I claim 1st, The combination of the tubular stem B, and grooved disk or plate, A, with the corresponding grooved cap, 1, and its tubular stem, O, under the arrangement, and for operation as set forth.

2d. The combination with the concentrically grooved plates or disks, applied to each other as described, of the valve and its spindle, mounted and arranged in the joint, in the manner herein shown and described.

67,174.—Water Wheel.— Robert Dunbar, Buffallo, N. Y.

I claim, 1st, The rim, F, connected with and extending downwardly from the plate, K, on a circle of less diameter than the hub of the wheel, so as to form, in combination with the plate, K, and stationary disk, E, the lesser annular chamber, G, and in combination with the hub the larger annular chamber, J, for the purposes and substantially as described.

2d. The holes, j', in the plate, K, opening a communication between the chambers, M and N, through the annular chamber J, substantially as shown and described.

67,192.—Locomotive Head-light.—Edwin L. Hall, Utica, N. Y.

I claim the tube, B, constructed and operating substantially as described, and for the uses and purposes mentioned.

67,203.—Water Wheel.—William G. McGargy, Kutztown, Pa.

I claim the slanting scroll-buckets, A, sliding gates, B, lever, C, and crank, D, when constructed, arranged and operated as herein described and for the purposes set forth.

67, 216.—Carbureting Apparatus.— Franklin Ransom, assignor to T. F. Frank. Buffalo, N. Y.:

I claim two or more air-wheels, B, mounted on the same shaft and connected by the concentric cylinder, L, in combination with the receiver, C, and tub, A, arranged substantially as and for the purposes set forth.

I also claim, in combination with the wheels, B, B, the brakes, h, h, actuated by the float, M, and leaver v, for regulating the opreation of the apparatus, substantially in the manner specified.

I also claim the regulation vessel, J, and tube, N, arranged within the carbureting vessel, E, and operating substantially as described.

I also claim the shield, G, in combination with the fibrous material, H, and vessels J, E, as and for the purpose secified.

I also claim, in combination with the carbureting vessel E, the reservoir, F, for supplying the hydrocarbon liquid to the former, operating in the manner set forth

67,217.—Manufacture of Gas.—John T. Rich, Philadelphia Pa. Ante-dated March 25, 1867.

I claim, 1st, The process for preparing atmospheric air for chemical union with decomposed hydrocarbons, for the purpose of forming a permanet heating or illuminating gas, substantially in the manner set forth.

2d, The combination of the steam-pipe, h, funnel-formed mouth, a, of the pipe, b, and condenser, K, said parts being constructed and arranged substantially as set forth.

3d, Mixing a purified product of atmospheric air with hydrocarbon gas for dilution, either before or after decomposition of the fluid or other hydrocarbon, substantially as set forh.

67,239.—Fire-escape.—Carl Weildling assignor to himself, Alexander Lieder, and Charles Kinkel, New York City:

I claim, 1st, The upper frame F, G, H, with its windlass, I, and chains or ropes, K, K, all combined with the ladder, as and for the purpose set forth.

2d, In combination with the upper frame constructed and arranged as described, I claim the lower frame, A, B, C, D, with its turn-table, as and for the purpose set forth

67,244.—Lamp for Destroying Insects.— John Zimmerman Royalton Center, N. Y.

I claim the lamp, constructed as described, with a socket to secure it on the top of a pole, double walls with air-orifices, and whose wick-tubes are provided with perforated flaring nozzels, as described and represented.

67,248. —Washing Machine.—Chaney L. Andrews, Conneaut, Ohio.

I claim the combination and arrangement of the box, A, frame, B, with parallel grooves, B', in the side-pieces, plus, C, corrugated roller, D, handle, E, and bars, F, substantially as set forth.

67,255.—Steam Generator.—C. T. Boardman, Pawtucket, R. I.

I claim the arrangement, substantially as herein shown and described, of the single and double sections, G, G', constructed of horizontal and vertical tubes with steam spaces or chambers, and set for passage of the draught in reverse and return directions relatively to them, as herein set forth

Gas Engineer's Book of Reference,

Illustrated with numerous engravings, and containing description and prices of all articles required in connection with the system of Gas Illumination, as manufactured and supplied. By Geo. Bowe 4to. paper, $1.00.

GAS FITTER'S GUIDE,

showing the Principles and Practice of Lighting with Coal Gas, with details of Fittings. Paper, 40 cents.

GAS CONSUMER'S GUIDE.

By William Richards. 1 Vol., 50 cents.

For sale by

D. VAN NOSTRAND,
Publisher and Importer, 192 Broadway.

76

MINER'S PATENT STREET LAMPS

Are generally acknowledged to be the simplest, cheapest and most durable in use. The patentee is ready to fill all orders, or dispose of rights on liberal terms, as those at present engaged in the manufacture can attest.

JACOB G. MINER,
Morrisania, Westchester county, N. Y.

D. VAN NOSTRAND,
Publisher and Importer of Scientific Books,

NO. 192 BROADWAY, NEW YORK.

JUST ISSUED.

A new edition of the General Catalogue of

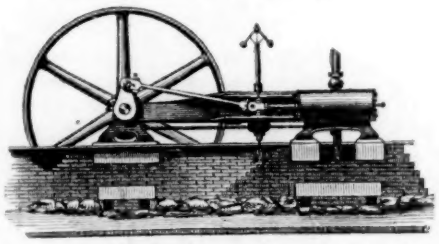
FOREIGN AND AMERICAN SCIENTIFIC BOOKS,

Thoroughly revised, and with additional new and valuable works, up to July 1st, 1867.

☞ Copies sent to any address, post paid, on application.

ERIE BASIN IRON WORKS,

MANUFACTURERS OF



Babcock & Wilcox Patent Variable Cut-off

STATIONARY STEAM ENGINES,

These Engines are conceded to be superior to all others in Economy of Fuel and Regularity of Motion and in Non-Liability to derangement; will save from 25 to 50 per cent. over any Engine in this market.

Flue and Tubular Steam Boilers,
Tanks, Oil Stills, Mill Work,
Machinery, etc., etc.

OFFICE AT THE WORKS ON

Elizabeth, Dwight and Van Dyke Sts.,
SOUTH BROOKLYN.

☞ Repairs done on Steamers at short notice.

WANTED—A SITUATION BY A RELIABLE and Experienced Workman of nearly 30 years' service in every branch of Gas and Steam Fitting, and the erection of every kind of Gas Works generally. He can superintend the working departments appertaining to Gas-Light Companies, having a thorough knowledge practically. No objections to any State in or out of the Union. Letters addressed to me at the Post-office, Augusta, Ga., will receive immediate attention. WM. J. CONLEY,
80-tf care of C. A. ROBBE, Plumber and Gas Fitter.

WANTED—Second-hand Purifiers about eight feet square—must be in good condition. State particulars and price, and address the Gas-Light Journal, No. 22 Pine street.

MUSGRAVE'S
GAS COOKING STOVE S

Office No. 158 West Sixth street,
CINCINNATI, OHIO.

☞ These stoves do every variety and kind of Cooking. They will work on a common wash-stand, table or shelf. Additional stoves may be attached at pleasure, to do any amount of work.

The apparatus is neat, cleanly and economical, and the labor saved is worth all the gas consumed.

Parties desirous of learning more of this valuable invention, can see the apparatus at 22 Pine street, Room 10, New York.

LABORATORY
OF
INDUSTRIAL CHEMISTRY,
DIRECTED BY
Professor H. Dussauce,
Chemist.

Advices and Consultations on Chemistry as applied to Arts and Manufactures, Agriculture, Metallurgy, etc. Plans of Factories. Drawings of Apparatus, Analyses of Ores, Manures, Mineral Water, and Commercial Assays in general.

Prof. H. Dussauce is ready to furnish information on the principal chemical manufactures such as:

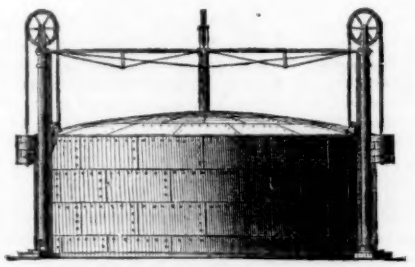
SOAPS,
CANDLES,
OILS,
PETROLEUM,
VINEGAR,
MATCHES,
MINES, ETC., ETC.

For further details address—

Professor H. DUSSAUCE, Chemist,
3 New Lebanon, N. Y.

ERIE BASIN IRON WORKS,

MANUFACTURERS OF



GASOMETERS

OF ALL SIZES INCLUDING

FRAMES, GIRDERS, STANDING PIPES, WALL PLATES, GAS MAINS, RETORTS, ETC. ETC.

ALSO

STANLEY'S
Patent Hydraulic Gas Main.

Our superior facilities for doing this class of work encourages us to solicit Gas Companies and others to give us their orders.

We have excellent arrangements for shipping directly from the works, the depth of water being ample.

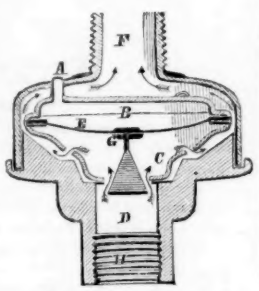
Office and Works on

Dwight, Elizabeth and Van Dyke streets,
SOUTH BROOKLYN, N. Y. 1

NOTICE

To Gas Companies and Gas Consumers.

THOMPSON'S GAS CONTROLLER



The only perfect SELF-ACTING REGULATOR and burner combined ever invented or known to science.

This Automatic Gas Controller works upon a simple and well-known principle in Mechanics. The lower cut fully shows its construction. The conical-valve at G is attached to the elastic diaphragm, E. As the gas enters in the direction as shown by the arrows, the diaphragm E is acted upon according to the pressure of the gas, and tends to close the valve upon its seat. The chamber, B, of the inner case communicates with the air by the orifice, (A). Hence the gas below the diaphragm is only balanced by the air above it and the valve fails or rises as the pressure varies, to regulate the admission of the gas, and consequently the pressure at the burner.

This Controller will save from 25 to 60 per cent. of gas according to the pressure in the mains, and gives a beautiful, steady light, at a minimum of cost.

Late improvements have made this Controller simple, durable and an unrivalled gas economizer.

Reference is permitted to the following gentlemen :—

Col. CHAS. ROOME Pres't Manhattan Gas Co, N. Y.
C. H. SAND, Esq, " Metropolitan Gas Co., "
J. H. ADAM, Esq., " New York Gas Co., "
PETER COOPER, Esq. Cooper Institute, "
JOHN A. DUFF, Esq., Olympic Theater, "
GEO. H. KITCHEN, Inspector of Gas Meters, "
A. L. BOGART, Esq., Gas Engineer, "
Col. J. A. SABBATON, Engineer Man. Gas Co., "
Col. A. J. WHITE " Met. Gas Co., "
J. K. SIMPSON, " Cooper Institute. "

Persons interested are invited to call at the office, 22 Pine-str't where they can see the operation by pressure guage and test meters.

M. L. CALLENDER, Agent.
22 Pine Street, N. Y.

E. BREESE, Travelling Agent.

THE

WASHINGTON MILL

AND

SILVER MINING COMPANY

OF ECHO DISTRICT, HUMBOLDT CO., NEVADA.

Capital Stock $300,000,

Issued for Mining Purposes.

60,000 Shares at Five Dollars each.

OFFICERS: Presidednt,—J. Clements Stocker. Vice President,— John J. Thomas. Secretary and Treasurer,—Henry Lee Reynolds. Superintednent,—William S. Sargent.

TRUSTEES: J. Clements Stocker, New York city. John J. Thomas, New York city. Lewis W. Phillips, New York city. F. Page Davis, Unionville, Nevada. Henry Lee Reynolds, New York city.

Office of the Company, 30 Pine street, New York.

☞ The mine of this company rapidly approaching that point of development which will necessitate the erection of a Mill, the Trustees are authorized to dispose of 10,000 shares of the reserve capital stock.

THE AUBIN BALANCED

VALVE WATER METER,

(Used also for Oils and Liquors)

IS NOW IN USE BY MANY CITY WATER Companies, because of its LOW PRICE, SIMPLICITY, DURABILITY, ACCURACY UNDER ANY PRESSURE, and, (a great advantage,) because it runs with less head than any other meter used.

Manufactured by

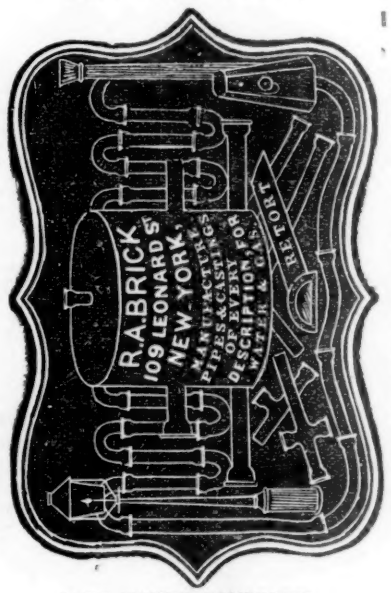
H. Q. HAWLEY,
Albany, N. Y.

CATALOGUE of Scientific, Military, Naval and Miscellaneous BOOKS just published, and sen free on application.

D. VAN NOSTRAND,
PUBLISHER,
163 192 Broadway, N.w

DRIVING PIPE,

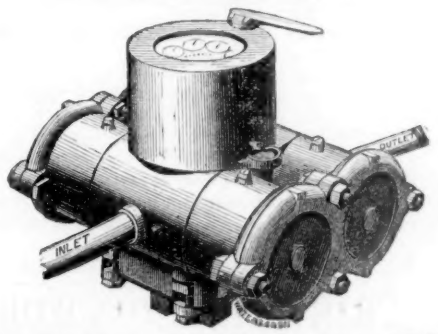
BERGEN IRON WORKS,



OFFICE 109 LEONARD STREET, NEW YORK.

AND BANDS COMPLETE.

H. R. WORTHINGTON'S



PATENT WATER-METER.

This Meter is also used for the measurement of Oil —it combines

ACCURACY, SIMPLICITY, and REMARKABLE DURABILITY with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.

HENRY R. WORTHINGTON,
61 Beekman steet, N. Y.

METROPOLITAN

GAS STOVE MANUFACTURING COMPANY.

Salesroom, 702 Broadway,

Above Fourth Street, New York.

PATENT GAS HEATING AND COOKING STOVES, RANGES, &c.

SCIENTIFIC GAS HEATING APPLIANCES,

For every known trade or profession.

PATENT PETROLEUM OR AEROVAPOR STOVES. PATENT KEROSENE OIL STOVES. PATENT PORTABLE VAPOR BATH APPARATUS.

Gas Stoves made by us are constructed under the immediate supervision of A. L. BOGART, Esq., Analytical Chemist and Gas Engineer. They contain recent improvements of a scientific character—by means of which a PERFECT COMBUSTION is obtained, and the Calorie produced, rendered CHEMICALLY PURE. Too much cannot be said against the use of Gas Stoves for heating apartments—when the products of combustion (Carbonic and Sulphurous Acids are emitted without purification into the atmosphere. Your Physicians will inform you, that this is a subject of vital importance) and worthy of your closest scrutiny—before purchasing. The public are invited to examine into the merits of these inventions.

Every article WARRANTED as represented.

Worthington's Steam Pump,

Extensively used by

GAS-LIGHT COMPANIES,

For sale at greatly reduced prices. Also, a new and highly successful Pump, driven by water pressure, requiring no attention or repairs, and the most economical water motor yet constructed.

☞ Patent GATES for Water and Steam-stops.

HENRY R. WORTHINGTON,
61 61 Beekman-st, New York.

THOMAS CASSIDY,

Iron Founder & Pattern Maker

Corner Hudson and Park Avenues,

BROOKLYN.

Iron Store Fronts put up at short notice.

Square and Round Columns, Truss Girders, Vault Beams, Window Lintels, Sills, &c.

A large assortment of Railing Castings constantly on hand, or made to order, at the shortest notice.

Lamp Posts—Brooklyn Pattern.

☞ A large stock of the usual sizes of Round Columns kept on hand.

J. H. TIEMANN.

ANALYTICAL CHEMIST,

Metallurgist & Mining Engineer.

☞ GOLD AND SILVER BOUGHT.

240 PEARL ST. Cor. BURLING SLIP, N. Y.
tf

Edw'd Van Orden & Co.,

Manufacturers of Fire and Water-proof

Plastic Slate Roofing Materials,

ROOFING TOOLS, &C.

Office 41 Liberty-st.

Edw'd Van Orden.
Jas. E. Dunn. NEW YORK.

MILLS CONVENIENT FOR SHIPPING.

CHAS. HOWDON SMITH,

BROKER IN MINING STOCKS

AND OTHER SECURITIES,

No. 5 1-2 PINE STREET,

ROOM NO. 5, NEW YORK.

T. CASSIDY & CO.,

(SUCCESSORS TO P. CASSIDY,)

Dealers in Old and New

IRON, COPPER, BRASS,

LEAD, SPELTER, &c.

Corner of Bridge and John Streets,

BROOKLYN.

☞ N. B.—The highest cash price paid for the above named articles.

T. CASSIDY. 57-80 J. PEARCE.

J. W. WHEELOCK,

DEALER IN

GASOLEINE.

SUITABLE FOR GAS MACHINES, ALSO FOR CARBURETTING OF GAS, &c.

70-94 **204 Pearl St., New York.**

JOSEPH NASON & CO.,

No. 61 Beekman street, corner of Gold,

NEW YORK.

Manufacturers of WROUGHT IRON PIPES and Fittings for Steam, Gas and Water, Boiler Flues, Steam Boilers, Coils, Heaters, Evaporators, Pumps, Ventilating Machinery, and Apparatus for Warming Buildings by Steam and Hot Water.

OIL TUBING, CAST IRON DRIVING PIPE, Boring Tools, Oil Pumps, Sand Pumps, Stuffing Boxes, Tongs, Clamps, Swivels, Joints, &c. 131

BRAYTON'S

Patent Steam Generator,

AND ENGINE.

A PERFECT SUCCESS. BY THIS INVENTION the long sought-for object has been accomplished; to wit: A means by which steam can be generated safely, so that there shall be no more danger from explosion than with the hot-air engine, and at the same time retain all the power of the steam engine. This much sought for result has at last been accomplished, and after many severe tests we feel fully warranted in offering this Steam Generator and Engine to the public as a perfectly safe power, and at the same time a cheap power. As a generator of steam for heating buildings, etc, there is not its equal in use. For further information or circular, address

R. A. HUTCHINSON,
159-182 Agent, No. 8 Dey-street, New York.

Mining & Petroleum Standard

AND

AMERICAN GAS-LIGHT JOURNAL,

Published on the 2d and 16th of Each Month

At No. 22 Pine Street, New York.

BRYANT, CALLENDER & CO.,

EDITORS AND PROPRIETORS.

FRIDAY, AUGUST 16, 1867.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

SUBSCRIBERS would confer a favor upon us by remitting CHECK OR POST OFFICE MONEY ORDERS, as we are frequent losers where money is enclosed in letters.

CONTENTS OF NO. 3.

Ashcroft's Steam Pressure Guage	49	Study on Coal Tars and Their Products	52
The Pantelegraph	49	Gas Machines and Gasoline	52
Priming Preventer	49	Carbolic Acid	53
The Water Supply of Our Great Cities	50	The Croton Aqueduct	53
Gas Cannel and Coals	50	Coal Market	53
Cost of the Sewerage Works in London	50	Patent Claims	54
Utilization of Blast-Furnace Gas	50	Answers to Correspondents	56
Chemistry, as applied to the Manufacture of Gas	51	EDITORIALS—	
Acetylene—Curious Experiments	51	Manufacture of Gas—The Brooklyn Gas Works	56
Miscellaneous Items	51	Advertising Agencies	57
		Death of John C. Brick Esq	57
		Ena Gas Stoves	64
		Peat for Gas	64
		The Aviton or Flying Machine	64

Answers To Correspondents.

L. B., of Pa.—If the negative pole of a conductor communicates with the ground, the illuminating power is twice as great as it is when the positive pole communicates with the ground; and the quantities of electricity producing the explosion in these two cases are to each other ½ to 1. The resistance to electric explosion is gases is proportioned to their pressure.

S. A. N., of Ohio.—Naphtha has similar effects to chloroform and laughing gas (protoxide of nitrogen) and has sometimes been used in place of it. It induces deep and tranquil sleep, and less stentorious breathing; but the effect on the action of the heart is more dangerous than either chloroform or laughing gas.

O. C., of N. Y.—Pure hydrogen possesses but little illuminating power, but its combustion produces great heat. M. Gillard endeavoured to overcome this obstacle by passing steam over incandescent charcoal in a retort, to produce hydrogen and carbonic acid gas and removing the latter by the action of chemicals. He then fitted a cage of platinum wire to the burner. The pale blue flame of hydrogen intensely heated this wire to incandescence when it emitted a brilliant white flame, without the emission of smell or smoke.

W. S., of N. Y.—Dr. Kyan, the inventor of the chemical process of treating wood to prevent decay called "Kyanzing," died in this city in 1849. He injected or introduced, by pressure, solutions of certain salts into the fibre of the wood. The Stafford & Nicholson method of steeping the wood for pavements in coal tar is similar to Kyanzing. The carbolic acid of the tar has the effect to prevent decay, and the asphaltum or tar resists moisture as well.

S. T. B., of Mass.—Peat charcoal is a powerful deodorizer. Mr. J. Burrows Hyde, of this city has secured patents for preparing peat charcoal and applying it to various purposes, such as preserving fruit, vegetables, etc., and for purifying sugars and liquids, etc. One improvement consists in preparing the charcoal in blocks of any size or shape for soldering and metaleurgical purposes.

A. P., of Ga.—Gas made of petroleum or refuse oils and fats require less purification, because they contain less nitrogen and sulphur, and consequently produce less ammonia and sulphuretted hydrogen. Magnesium was discovered by Sir H. Davy, though in a quantity too minute to determine its properties. M. Bussy, in the year 1830, prepared it by the action of potassium on chloride of magnesium. It is now prepared in large quanties by the Magnesium Manufacturing Company, of Boston, Mass.

MANUFACTURE OF GAS—THE BROOKLYN GAS WORKS.

The extent of the gas works that supply a million of people with light for their streets, dwellings, business and amusements, is far beyond the popular conception. Any one of the dozen establishments embraced within the Metropolitan District would be enough to give a new sensation to ninety-nine hundreths of its inhabitants, by the various, curious and enormous apparatus it employs. The enlargements and improvements now being made in the Brooklyn Gas Works—to which none in the United States, probably, are superior—invite attention to the system there established, as a representative of this branch of the arts. Our acknowledgments are due to A. F. Havens, Esq., the able engineer of the works, for obliging attention to our inquiries relative to the operations under his direction.

Larger retorts than have ever before been used in the manufacture of gas, are to be tried in "benches" of the usual dimensions, increasing the charge by several hundred pounds, without (it is expected) any material increase of fuel for the distillation. This is done by simply occupying room hitherto wasted in the arch and between the retorts. The unprofessional reader will understand that the retorts are semi-cylindrical ovens of baked fire-clay—great hollow tiles in short—eight or ten feet long, laid horizontally on the flat side, or bottom, which is usually twenty or twenty-two inches wide, while the arched top is about fourteen inches high. They are laid in arched fire-brick furnaces, or "benches," as they are called, with five retorts in a bench. The transverse section of a "bench" is like an inverted U (∩) the extreme width and height being nearly equal, each about six and a half feet, and the depth or length, as before stated of the retorts, about eight feet. Centrally, in the very bottom, is the fire place On each side, and a little above the fire place, a retort is inserted endwise; above each of these is another, a little larger, and centrally above them all filling the arch, is the fifth and largest retort. Flues from the fire-place envelope these retorts, passing upon one side and down on the other, and then into the chimney; the front and back is of course bricked up, and the mouths of the retorts are closed, after charging, with luted iron doors, bolted on, so as to leave no escape for the products of distillation, except the upright iron pipe, which rises from the mouth of the retort to the hydraulic main. The benches are built in close series, like long blocks of houses, the hydraulic main runs horizontally over their tops, and the five upright retort pipes from each "bench" make a bristling array all together, standing close, in rows hundreds of feet long.

Mr. Havens has found room in the waste spaces of the usual-sized bench, to enlarge the capacity of the middle retorts from 14 x 22 to 14 x 26 inches, and that of the large retorts in the tops to 15 x 43 nches; thus presenting a much larger proportion of heating surface, and economizing the fuel, as calculated, to an extent nearly or quite equal to the increase of the charges. The outlet pipe of the large retort has to be enlarged at the same time to a diameter of eight inches, and in order to introduce this area of pipe into the hydraulic main, without being obliged to enlarge it or to obstruct it, the pipe is flattened out to an oval form and somewhat enlarged, where it enters the main, and so does not fill the diameter of the main any more than a four or six inch pipe would do. It is necessary for the pipe to *enter* the main, which is kept partly full of water, in order to immerse its end in the water, and prevent the return of the gas after it has once bubbled through into the empty or gas space above the water.

The principle last referred to, called the "hydraulic valve," is of inestimable service in gas manufacture, and is one of the most beautiful instances of simplicity and perfection united in a mechanical expedient. The first elimination and retention of the gas from the retort, formerly done through the imperfect means of a common valve, is now effected by this principle; the retention and management of the gas in the process of distribution is also due to the same; and Mr. Havens now proposes to apply it in the construction of the condenser, so as to dispense with turns in the pipes, which accumulate deposits of condensation, choke up, and require to be periodically taken apart and cleaned out.

Meanwhile, to provide for the satisfaction of unprofessional curiosity, while we are about it, we will mention that the gas passes from the hydraulic main into what may be called an immense washing tub, where it is washed free from suspended impurities, such as smoke (particles of carbon), and other ingredients of the coal, not volatilized. The gas enters this tub, or cistern, at the bottom, and is broken up and diffused in thin currents by obstructions, such as brush wood, while at the top enters a shower of water through perforated pipes. Through this shower the buoyant gas forces its way upward, while the water catches, saturates and carries down the suspended impurities. At the top the gas flows off again, washed of its soot, and ready for chemical purification from its sulphur, ammonia and volatilized oils. The former of these are removed by passing through a reservoir filled with perforated or slotted trays covered with lime, which combines with the sulphuric acid, forming sulphate of lime. The volatile oils will condense in the street pipes and fill them with disagreeable and dangerous matter, if allowed to pass off in a warm state. The gas must be cooled in a condenser to a certain temperature, which will reduce and remove the numerous hydrocarbon oils that mingle in its original composition in the form of hot gases.

The condenser consists of a series of upright pipes immersed in a tank of water, through which the gas winds its way up and down, until sufficiently cooled to deposit its oils. The gas first enters a base-box (under the water tank) which is divided into tight compartments. From the first of these compartments rises a row of pipes, which bend at the top, and returning to the base-box, open into the next compartment. Another set open upward from this compartment, and returning, open downward into the next, and so on. This provides for the forward movement of the gas throughout the series, and for the dripping of the condensed oils into the base-box, whence they are drawn off by pipes. Mr. Havens will do away with the bend of the pipes at the top, where oil-gums accumulate, and compose his new condenser of straight and isolated pipes. Each set of upward pipes will open into an upper box formed by a cup inverted in water, and the return pipes will open out of the same box and conduct the current of gas from the upward set down into the next compartment of the base box, and so on. The simplicity and usefulness of this improvement excite the usual wonder, not at the invention, but its tardiness. Mr. Havens' new pipes will also be jointed with the base box in a simpler and more accessible manner than is usual. It is another surprise of the kind just noticed, that expedients both clumsy and expensive have been adhered to, when the simple and common mode of bolting the pipe on by a flange, with a felt packing, adopted by Mr. Havens, is so obvious.

We come last to the most extensive piece of work in progress—the building of a new gas-holder of extraordinary size. The policy of distributing the stock of gas in a number of, say 300,000-feet gas-holders, is generally pursued in American cities. In Philadelphia, they have built tanks of great diameter, which, with the double telescopic gas-holders, would have a vast capacity; but using single gas-holders they are not so much larger than those ordinarily used in New York and vicinity. The one now building in Brooklyn, will be, probably, the largest in capacity in the United States. The three gas-holders now employed by the Brooklyn Company are set in tanks 91 feet in diameter, and 26 feet in depth, and have a rise of 53 to 54 feet. They occupy a single yard. The new yard on Front street, between Bridge and Gold, is about 400 feet square, and has been divided into quarters for four large gas holders, 112 feet in diameter, so as to use up the ground economically. The new gas-holders will have a diameter of 112 feet, depth of tank 25 feet, a rise of 65 feet, and a capacity of some 600,000 cubic feet each.

To explain this department also, popularly: A huge brick cistern is built in a cylindrical form and properly cemented. The one in question, now nearly completed, is 112 feet in diameter, and 35 feet deep, and contains over two millions of brick. Ten massive hollow piers are built at equi-distant points of the circumference, to support as many hollow iron columns, 65 feet high, 5½ feet in diameter at the base, and 3 feet at the top. These columns are to be united at the top by 10 iron girders 36 feet 4 inches long, of a new pattern, designed and cast expressly for this piece of work. The gas-holder proper consists of two parts: first, the outer section (within which the other slides, like the joints of a telescope) which is a simple drum of boiler iron, entirely open at bottom and top, standing in, and filling, within a few inches, the diameter of the great water-tank above described. It is suspended by chains passing over pulleys or sheaves at

the top of the columns, and attached to counter-weights rising and falling within the hollow interior of the columns. On its upper edge a rim is formed, turning inward and then downward, in the shape of an inverted L (⅂) so as to interlock with a similar rim formed in the opposite direction (outward and upward) on the lower edge of the inside section. This latter, it will be perceived, forms an annular cup, which is to be kept full of water; while the former is a similar cup inverted and matching into the latter. The two, with the water in them, make a hydraulic joint, which, though loose in play and detachable, permits no gas to pass. The inside section is closed at top and open at bottom, and is suspended, like the other, by chains passing over the sheaves at the top of the columns. Such is the position of affairs when the gas-holder is half filled, or more, with gas. When emptying, the two sections, interlocked in the manner above described, descend together until their joint is even with the water in the tank, and the outer and lower section has at the same time drawn out all its chain, and can descend no farther. The inside section, slipping out of its loose joint with the other, continues its descent until the inside of its crown or top rests upon the water of the tank, and it is completely filled with water instead of gas. If, now, gas at a certain pressere be turned into the gas-holder, the inner section, buoyed up by the pressure, will fast ascend alone as it fills, until its cup-like rim, coming up full of water, engages with the inverted cup-rim of the outer section, and in continuing to rise, lifts the outer section up with it until only its lower edge is immersed a few inches in the water, just sufficient to prohibit the escape of gas.

The arrangement of the chains and pulleys for the suspension of the two sections, has heretofore been strikingly infelicitous. The outer section has been suspended from all of the columns save one. That one—leaving the outer section to sag unsupported at that point—has been appointed to do the whole work of suspending and counterbalancing the inner section. For this purpose wire ropes attached to equidistant points all around the section, pass around the structure on pulleys, from their respective points of attachment to their meeting point at the one column appropriated to them, where they pass over one sheave or drum and connect to a common weight. The complication, clumsiness and liability to derangement of this system, could hardly be exceeded. Mr. Havens accomplishes the object perfectly, smoothly and symmetrically. Each section has its own sheave, chain and counter-weight on each column, and is perfectly balanced, supported and adjusted at all points. The counter-weights move within the same space in the interior of the column; that of the outer section, having in no case to rise above half the height of the column, is always below the other weight, and its chain passes through a slot in the latter, so that they follow one another within the same space in perfect harmony. Thus, when the gas-holder is empty, and both sections are down and immersed in the tank, the weight connected to the outer section is raised, say to mid-height on the column, and that of the inner section is raised to the top. As the gas-holder fills, the inner section rises first, and at the moment when it couples with the other, its weight has descended nearly to contact with the other weight. Then the outer section begins to rise with the inner, and both their weights descend together to the foot of the column.

The Gas-Governor employed at these and some other works, for regulating the pressure uniformly under all conditions, is a beautiful and effective contrivance, which it is hard to understand why all do not adopt. It consists of a small single gas-holder (like the inner section already described) working in a tank of water, with a conical valve in the outlet pipe. The supply pipe enters at the bottom, and rises vertically, opening above the surface of the water. A large conical valve, apex upward (like the letter A) fits a seal in the outlet pipe, the passage in which is as large, when fully open, as the grand feed main. The valve is suspended by its apex, from a stem passing up through the top of the gas-holder, and connected with a weighted rope and pulley. A certain pressure in the reservoir in excess of that in the outlet pipe or feed main—that is, in the pipes of the city generally—is of course required in order to allow any gas whatever to pass the valve; such required excess being exactly determined by the weight on the pulley. When the gas is simultaneously lighted at dark in a thousand places, the pressure in the service mains being lightened, the increased excess of pressure in the reservoir opens the valve further, and as instantly adjusts the pressure. So when the gas is generally turned off, the increased pressure in the service mains presses the valve back, so that just as little gas can pass as is demanded to supply the actual consumption of the moment. At night, however, when rapid drafts are made by consumers, the valve is partially freed, and the pressure in the reservoir increased, by transferring weight from the pulley to the top of the reservoir; and when minimum pressure is required, as in day-time, weight has to be transferred in the opposite direction. Index guages show the pressure existing and what changes are required at all times. In the Governor for the new gas holders, Mr. Havens proposes to dispense with the weights and simplify the apparatus by building the Governor reservoir with water and air compartments which the demand for pressure will fill or discharge automatically, as the case may require.

Our next notice will probably be devoted to very interesting improvements in gas manufacture to be introduced in the new works at Paterson, N. J., John Drew, Esq., Engineer.

DEATH OF JOHN K. BRICK, ESQ.

Intelligence has been received of the death of Mr. John K. Brick, for many years a prominent, wealthy and respectable citizen of Brooklyn, N. Y. The sad event occurred at Hot Springs, Arkansas, where he had previously visited for the benefit of his health, with excellent results, we understood. His late visit to Arkansas was for the purpose of continuing the beneficial effects of those medicinal waters, but it seems they had lost their virtue in his case.

The deceased was the builder of the Gas Works of the Brooklyn Gas Company, and subsequently a director and stockholder in the company.

He possessed a large amount of real estate in Brooklyn and vicinity, and was largely interested in the extensive brick works of J. K. Brick & Co, in South Brooklyn. The deceased was a thorough practical business man, of large enterprise, and of a kind and philanthropic nature—loved and esteemed most by those who knew him best.

ADVERTISING AGENCIES.

It is now something like thirty years since the establishment of the first Advertising Agency in this country. At that time there were scarcely eight hundred periodicals of all descriptions printed in the United States, while now the number will exceed four thousand. Advertisers have increased and agencies been established in every important city, and have proved a great assistance to the newspaper press.

It is estimated that at the present time there are several hundred men who make this their business, but of these no more than twenty are known to any considerable extent, and by far the most important are two or three well known firms in New York city, among which the house of Geo. P. Rowell & Co, No. 40 Park Row, occupies in some respects the most prominent position. Although not among the oldest, this one, by the energy and business ability which has characterized it, has become the authorized agent of nearly every newspaper printed in the English language in North America, and the amount of their transactions exceed the combined business of many of the older but less enterprising establishments.

At their office may be found on file newspapers from every section, from Maine to California, and from their books can be learned the rates for subscription and advertising.

The distance of advertisers from the newspaper publishers, as a general thing, renders it difficult for the latter to be correctly informed of the financial reliability of their customers, and therefore they usually prefer to receive their favors through some reliable advertising agency, which, in consideration of the commission allowed, assumes all risk of payment, and does away with the trouble and expense of collecting individual accounts.

The house named in this article is authorized to contract for our paper at our lowest rates, and we assure customers at a distance that we prefer to receive orders through them, rather than to contract direct with parties who are unknown to us, no matter how good or responsible they may be.—*Exc.*

☞ The Exhibition by the American Institute of the city of New York, to commence on the 12th of September, is of such general interest, that we would direct the attention of inventors and manufacturers who desire to compete for prizes to make immediate application for a place. No charge is made for space or steam power. All communicationss relating to the Exhibition should be addressed to Prof S. D. Tillman, American Institute, New Yerk, who will furnish copies of the rules and regulations adopted by the Board of Managers. See advertisement on page 60, first column.

EXTINGUISHER.

Portable Self-Acting Fire Engine.
No Building Safe Without Them.
Price, $45, $50, $55.
☞ Send for Circular.
U. S. FIRE EXTINGUISHER CO.,
184] 8 Dey street, New York.

HEALTH AND ECONOMY.

PATENT LEAD-INCASED TIN PIPE COSTS LESS THAN LEAD PIPE AND IS MUCH STRONGER.

INDORSED BY PHYSICIANS AND WATER COMMISSIONERS EVERYWHERE.
Recent improvements enable us to supply this pipe at a less price per foot than common lead pipe. To furnish the cost we should know the head or pressure of water and bore of pipe.
Pamphlets sent free. Address the
COLWELLS, SHAW & WILLARD M'FG CO.,
184-2t) Foot of West Twenty-seventh st., New York.

FOR SALE.

CASTINGS, STATION METER, ETC. — THE Wilmington (Del.) Gas Company having enlarged their works, have the following articles for sale:
Three sections of hydraulic main 15 inches diameter, suitable for three benches of three retorts each, with stand &c., and Dip Pipes of 3 inch diameter.
Four Purifying Boxes 4 by 6 feet, centre seal, and boxes for Condensers to rest on. One large Scrubber 4 feet diameter, 16 feet high. Three 6 inch valves and all the pipes, bends, etc., necessary for the Purifying House and Cellar. Three castings, used for washers, 16 inches diameter, 12 feet high. One Station Meter 4 feet diameter. One Governor and all the valves, pipes and bends necessary to make the connections in Meter House and Cellar.
The above are in good condition and can be seen at the Works. Will be sold low if applied for soon. G. Richardson, Pres. (84-4t

OIL BARREL MANUFACTORY FOR SALE,

TOGETHER WITH THE PATENT RIGHT OF an improved process of barreling, which has been tried and approved by the heaviest shippers in the country. For further information apply to A. CARR, 45 Courtlandt street, N. Y. (184-2t

B. S BENSON,
MANUFACTURER OF
CAST IRON TUBES AND FITTINGS.
Office and Factory 52 East Monument street,
BALTIMORE MD.
All pipe cast vertical 12½ feet long, from 3 to 30 inches diameter. [184

GAS WORKS FOR SALE.

ONE OF THE BEST AND MOST PROFITABLE Gasworks in this State; terms libera. Full particulars may be obtained by applying at 45 Courtlandt street, N Y. (84-2t

Professor HENRY WURTZ,

Formerly Chemical Examiner in the U. S. Patent Office, may be employed professionally as a SCIENTIFIC EXPERT. Geological Examinations and Reports, Analyses and Assays etc. etc., Practical Advice and Investigations in the CHEMICAL ARTS and MANUFACTURES. Invention and Examination of new chemical methods and products. Address 26 Pine street, rooms 35 and 36. Always in at 1 P. M.

☞ WRITTEN COMMUNICATIONS PREFERRED.

IMPORTANT TO GOLD AND SILVER MINERS AND COMPANIES.

PROFESSOR WURTZ,

Who is the inventor and Patentee of the new and wonderful uses of

Sodium in Working Gold and Silver Ores and Jewelers' Sweepings,

Will furnish at the above address information relating thereto together with experimental packages of

SODIUM AMALGAM

TO PARTIES ENGAGED IN MILLING ORES ONLY.

All preparations and instructions elswhere obtained are spurious and unreliable.

☞ WRITTEN COMMUNICATIONS PREFERRED. (1-tf

LACLEDE FIRE BRICK WORKS,

S. HAMBLETON & JAS. GREEN,

PROPRIETORS,

Cheltenham. Mo.

Office, No. 1007, North Levee,..... St. Louis,

HAMBLETON & GREEN,

MANUFACTURERS OF

Fire Bricks, Tiles, Gas Retorts, Sewer Pipes, &c., &c.

Have on hand a good assortment of articles in their line, of a very superior quality, manufactured by them from the celebrated Fire Clay of Cheltenham, and for sale at reasonable prices and in quantities to suit,

AMONG WHICH ARE

BOILER TILES, Centre and Side of all sizes.

BRIDGE TILES, 6x12, 12x12, 12x18 and 12x24 inches.

CIRCULAR BACK TILES, all sizes.

FIRE BRICKS, Square, Arch, Split, Soap, Pressed, Jamb, Wedge, Key, Bull Heads Cut, &c., &c.

BLAST FURNACE LININGS, Bosh Brick and Timp Tile.

CHIMNEY TOPS, Fancy and Plain.

SEWER PIPES, all sizes.

GAS AND BONE RETORTS.

GROUND FIRE CLAY, &c.

Orders left at the office, No. 1007 Levee, between Washington and Carr streets, will receive prompt attention, and goods delivered without delay,

Purchasers can depend upon all articles purchased from us being equal, if not superior, to any other made in the country. (1-1y

P. J. MOORE. T. L. GAUSSEN, Late Inspector Cin. Gas Co.

MOORE & GAUSSEN,

PLUMBERS,

Gas and Steam Fitters,

221 WEST FIFTH STREET,

Between Elm and Plum,.....CINCINNATI.

Pumps, Hydrants, Water Closets, Water Stands, Wash Basins, Water Rams, Slabs, Bath Tubs, &c. Street Lead and Lead Pipe, Wrought Iron Steam, Gas and Water Pipe of all sizes, Cast Iron Drain Pipe, Bends, Tiles, Branches, &c.

GAS FIXTURES OF ALL KINDS.

Chandeliers, Pendants, Brackets, Drop Light Argand Burners, Portable Gas Stands, Still Flame Shade Globes, Bells, &c.

Repairing Promptly Attended To.

J. S. PHILLIPS, C. E. M.,

MINING ENGINEER, Etc.,

from Cornwall, who came to work Ledges for a New York Company at Humboldt, Nevada, is free for Examination or Superintendence of Mines, in consequence of his immediate condemnation and abandonment of those operations.

REFERENCES:—Messrs. Daniels, Crozier, Coe, & Co., Bankers, etc., 22 Nassau street, New York. Orders by Telegram, Humboldt City, Nevada. n74-3t

WILLIAM ELTING

Manufacturers Agents for the Sale of

PORTABLE AND

Stationary Steam Engines,

BOILERS AND MACHINERY,

No. 65 Liberty-St, NEW YORK.

☞ Leather and Rubber Belting supplied at usual rates. Circulars sent on application. 55-78

BIRD, PERKINS & JOB,

IMPORTERS OF

COAL FOR GAS, STEAM AND IRON MANUFACTURES.

Agents for the sale of the **Westmoreland** Coal Company's celebrated

GAS COAL,

and the Consolidation Coal Company's "Ocean Mine"

CUMBERLAND COAL.

Particular attention given to the charter of vessels at the lowest freights.

39 INDIA WHARF, Boston. 104 WALL STREET, N. Y. 134

A. HITCHCOCK,

Inventor and Manufacturer of the

Cam Quartz Breaker and Pulverizer,

REVERSIBLE ROLLER MILL,

IDAHO MILLS & AMALGAMATORS,

Adapted to All Kinds of Power.

Unequalled for utilizing power—avoiding friction and wear,—rapidity of work, and facility of transportation and adjustment.

Also, **Hitchcock's Adjustable Tubular Flue-cleaning Boiler**, and other valuable Patents, for which license to manufacture will be granted on reasonable terms.

Circulars furnished on application.

53-76 *Office No. 4 & 6 Pine Street, New York.*

GEO. H. BRONSON,

132 Malden Lane, New York,

Dealer in

Paraffine Machinery Oil,

From PURE CANNEL COAL, adapted to all classes of

Stationary Machinery, Locomotive Engines, Railroad Cars, Woolen Factories, Cotton Spindles, Sewing Machines, &c.

Paraffine Wax and Paraffine Wax Candles. Also the best brands of Burning Oils. All Oils guaranteed to answer the purpose for which they are recommended.

57 80

D. B. GRAY,

DEALER IN ALL KINDS OF

INDIA RUBBER GOODS

Vulcanized Machine Belting,

Conducting, Hydrant, and Engine Hose,

GUM STEAM PACKING,

Amidon's Improved Clothes Wringer,

And all kinds of Useful and Fancy Rubber and Vulcanite Goods,

No. 201 Broadway,

Middle of the Block between Fulton and Dey Streets, NEW YORK.

WILLIAM S. CARR & CO.,

Succesor to Sawyer & Co.,

SOLE MANUFACTURERS OF

Carr's Patent Water Closets,

URINAL VALVES, &c.

Also Manufacturers and Dealers in PLUMBING MATERIALS OF EVERY DESCRIPTION, Plumbers' Brass Works, Earthen Ware, Pumps, Iron Drain Pipes, Traps and Sinks, Copper Bath Tubs, Showers, &c., &c.

OFFICE AND MANUFACTORY

149, 151, 153, 155, 157 Centre Street, cor. Canal,

NEW YORK.

Illustrated Catalogue and Price List sent on application.

152-176

JAMES HOY. JNO. P. KENNEDY. WM. E. HOY.

HOY, KENNEDY & CO.,

Engineers and Contractors

FOR THE ERECTION OF

GAS WORKS,

Extensions, and Improvements, are prepared to supply

GAS-LIGHT COMPANIES

With all the materials used by them. [77-t

No. 111 Liberty street. New York.

JOHN P. NESSLE. JAMES A. TAYLOR.

Nessle & Taylor,

MANUFACTURING ENAMELERS

OF

IRON AND OTHER METALS.

97 Water street, Brooklyn. 171tf

NEW SYSTEM OF VENTILATION.

—BY—

HENRY A. GOUGE.

☞ Pamphlets sent free. Address Henry A. Gouge, 254 Broadway, New York. 173

SCHOOL OF MINES,

COLUMBIA COLLEGE,

EAST 49th STREET, NEW YORK.

FACULTY:

F. A. P. BARNARD, S.T.D., LL.D., President.
T. EGLESTON, JR., E. M., Mineralogy and Metallurgy.
FRANCIS L. VINTON, E. M., Mining Engineering.
C. F. CHANDLER, Ph. D., Analytical and Applied Chemistry.
JOHN TORREY, M.D., LL.D., Botany.
CHARLES A. JOY, Ph.D., General Chemistry.
WILLIAM G. PECK, LL.D., Mining Surveying and Mechanics.
JOHN H. VAN AMRINGE, A.M., Mathematics.
OGDEN N. ROOD, A.M., Physics.
JOHN S. NEWBERRY, M.D., Geology and Palæontology.

The plan of this School embraces a three years' course for the degree of ENGINEER of MINES, or BACHELOR of PHILOSOPHY.

For admission, candidates for a degree must pass an examination in Arithmetic, Algebra, Geometry and Plain Trigonometry. Persons not candidates for degrees are admitted without examination, and may pursue any or all of the subjects taught. The next session begins October 7, 1867. The examination for admission will be held on October 8. For further information and for catalogues, apply to

180–1yr. **DR. C. F. CHANDLER,** DEAN OF THE FACULTY.

SUMMER STOVES.

The uncomfortable heat in the house, as well as much time and expense and the dust of coal and ranges, may be avoided by the use of the

ETNA, or STAR GAS STOVES,

OR

EDDY OIL STOVES,

WHICH COOK IN THE MOST PERFECT MANNER.

☞ Sold at all House Furnishing Stores.

MOORE & NICHOLS,

1-2t] Manufacturers, 45 Dey street, N. Y.

EMPIRE LINE

FOR SAVANNAH, GEORGIA,

Every Saturday, the elegant Side-Wheel Steamships

SAN SALVADOR,

Commander, Joshua Atkins, and

SAN JACINTO,

Commander, Winslow Loveland.

Every SATURDAY, from pier 13 North River.

Have been placed on the route to Savannah by the Atlantic Mail Steamship Company of New York, and are intended to be run by them in a manner to meet the first class requirements of the trade.

The cabin accommodations of these ships are not excelled by any Steamers on the coast, and although their carrying capacity is large, their draught of water enables them to insure a passage without detention in the river

San Jacinto,	Saturday,	Oct.	6	San Jacinto	Saturday,	Nov.	3
San Salvador,	..	"	13	San Salvador	..	"	10
San Jacinto,	..	"	20	San Jacinto	..	"	17
San Salvador,	..	"	27	San Salvador,	..	"	24

Returning, leave Savannah every Saturday at 3 o'clock, P. M.

Bills of Lading furnished and signed on the Pier.

For further particulars, engagement of Freight or passage, apply to

GARRISON & ALLEN, Agents, No. 5 Bowling Green.

Agent at Savannah, B. H. HARDEE.

MANHATTAN

Fire Brick & Enamelled Clay Retort Works,

MAURER & WEBER,

(Of the late firm of B. Kreischer & Co.)
PROPRIETORS.

Office & Works in 15th street, Avenue C,

MANUFACTURERS OF

Fire Brick and Tiles,

OF ALL SHAPES & SIZES,

Fire Mortar, Clay and Sand.

☞Articles of every description made to order, at short notice. (135

HY. MAURER. ADAM WEBER.

NEW YORK

Fire Brick and Clay Retort Works

☞ *Established in* 1845, ☜

(Branch Works at Kreischerville, Staten Island,)

B. KREISHER,

Office 56 Goerck St, cor. Delancey, New York.
GAS RETORTS, TILES and FIRE-BRICK of all shapes and sizes.
FIRE MORTAR, CLAY, and SAND.
Articles of every description made to order at the shortest notice.
B. KREISCHER.

J. K. BRICK & Co,

BROOKLYN CLAY RETORT,

—AND—

FIRE BRICK WORKS,

VANDYKE STREET, BROOKLYN, N. Y.

JOSEPH K. BRICK, EDWARD D. WHITE.

J. H. GAUTIER & CO.,

MANUFACTURERS OF

Gas Retorts, Tiles and Fire Bricks,

Black Lead Crucibles, and Carburet of Iron Stove Polish,

JERSEY CITY, N. J.

Refer to—Manhattan Gas Light Co., New York. [135

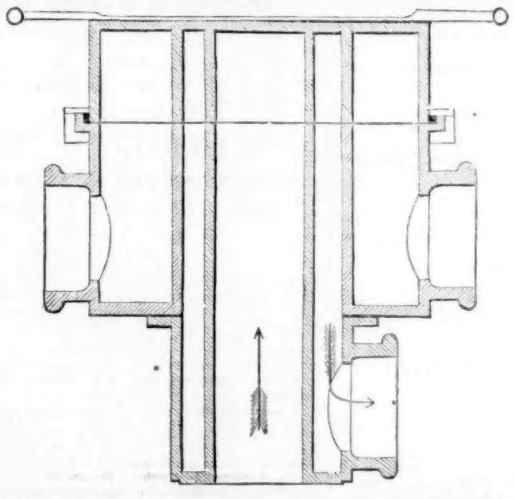
Philadelphia Fire Brick Works,

Corner of Vine and Twenty Third sts., Philadelphia,

JOHN NEWKUMET,

Manufacturer of all kinds of FIRE-BRICK, GAS-HOUSE TILES, to suit all the different plans in use. Clay Retorts and Dentists Muffles. Orders filled at short notice.

PATENT DRY CENTRE VALVE.



The **American Meter Company** invite the attention of Gas Engineers and Gas Light Companies to the PATENT DRY CENTRE VALVE, which is very superior to the HYDRAULIC CENTRE VALVE, and much more durable, besides being less expensive, and not likely to leak or get out of order. It has been successfully introduced at the following Gas Works, where reference may be had of its satisfactory performance:

Detroit, Mich.....	16 inch.	Louisville, Ky.....	6 inch.
Philadelphia, Pa....	12 "	Covington, Ky.....	6 "
Patterson, N. J.....	12 "	Zanesville, Ohio.....	6 "
Pittsburg, Pa.....	10 "	Indianapolis, Ind.....	6 "
Cleveland, Ohio.....	8 "	St. Joseph, Mo.....	4 "
Bloomington, Ill.....	8 "	Maysville, Ky.....	4 "
Meadville, Pa.....	6 "	Troy, Ohio.....	4 "

Having the Patterns complete for each size, from four inches to sixteen inche we are prepared to furnish them at short notice.

AMERICAN METER COMPANY,
512 West 22d Street, New York.
22d and Arch Street, Phil'a.
73-tf 23 West Street, Boston.

PRINCE'S METALLIC PAINT.

AN INDESTRUCTIBLE COATING FOR

IRON, TIN, and WOOD.

It consists of seventy-two parts Oxide of Iron, and twenty-eight parts Cement Lime Stone in the one hundred pounds.

It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

It is a perfect cover for all kinds of iron, tin, or wood-work, out-houses, and canvas coverings. It prevents and arrests the corrosion of metals, and is not affected by the action of salt, gases, acids or ammonia.

It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though said at double its price.

As a coating for patterns of iron or wood, when mixed with shellac, it is much superior to beeswax, oil, or shellac alone, as has been proven at the large founderies in the country.

For patching boilers and making joints, it is considered superior to red lead, or any other preparation.

For cleaning metals it takes the place of crocus, ounge, and emery, being better and cheaper.

This Paint requires no more oil than dry lead or zinc, and much less than the ordinary mineral paints. It is free from any waste, and possesses a spreading and covering power unequaled.

Terms, by the Barrel or Half Barrel, Five Cents per Pound.

A liberal discount made to parties purchasing by the ton.

A Barrel or Ton will be forwarded to any gas companies desirous of testing its qualities, for which there will be no charge if it does not give entire satisfaction as being the cheapest and most durable of all other Paints in the market.

Also, Prince's Imperial Black Paint, and Prince's Protoxide of Iron.

DANIEL SLOAN & CO., General Agents
115 LIBERTY STREET, NEW YORK.

Local Agent—CALVIN GAY, 29 Federal st., Boston.

WATER AND SEWERAGE PIPES,

KNIGHT-BAILEY PATENTS.

The Water Pipes are made of Wrought Iron, lined with Hydraulic Cement, with Socket Joints, and connections for service pipes already inserted. Entirely free from oxidation, they are absolutely indestructible. They can be laid and guaranteed for much less than Cast Iron Pipes.

The Sewerage Pipes are made of Hydraulic Cement. They stand the most severe tests of acids, increase with age, are perfect in interior finish, and cheaper than any other pipes made.

☞ We will contract for the water supply and drainage of cities and villages.

AMERICAN WATER AND GAS PIPE CO.,
N. W. corner of Green and Bay Streets, Jersey City.

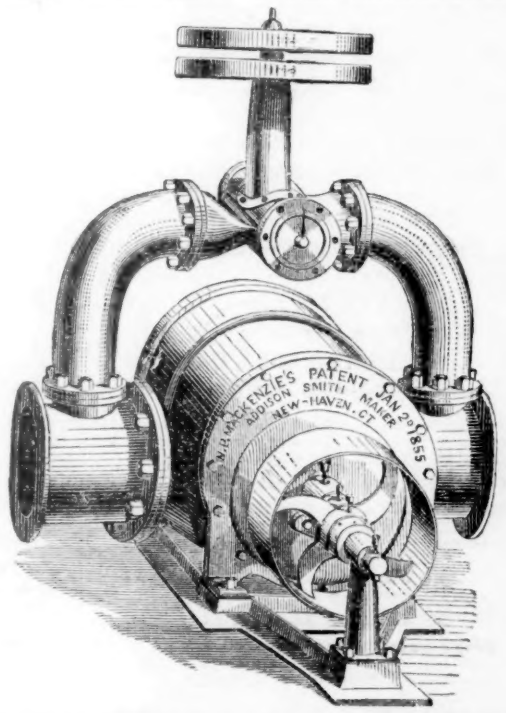
DIRECTORS:

J. R. HALLADAY, Pres. G. H. BAILEY, Eng'r. GARWOOD FERRIS, Treas.
WILLIAM KEENEY. JAMES CRAWFORD. STEPHEN MORGAN.

Smith & Sayre Manufacturing Company.

The Mackenzie Patent Gas Exhauster,

AND PATENT COMPENSATOR.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 ton to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent. fuel. Address

B. KREISCHER, Prest.
JAS. SAYRE, Treas,
CHAS. W. ISBELL, Sec'y Office 484 Broadway, New York.

AMERICAN INSTITUTE EXHIBITION. — A grand display of American genius, skill and industry will be opened to the public on the 12th of September, and close on the 26th of October next. The Board of Managers earnestly request every inventor and manufacturer desiring to exhibit novelties, to make immediate application for space. Although the Exhibition building covers 40,000 square feet and contains the largest rooms in the city of New York, it will be far too small to accomodate all who desire to compete for prizes. A new classification of articles on exhibition has been adopted by the Institute, also a new plan of awarding prizes. Every successful competitor will receive, in addition to a medal, a Diploma or Certificate, setting forth in detail the superior qualities of his article, as approved by disinterested judges. No charge will be made for space or for steam power. Each application for space must give the name and exact dimensions of the article offered for competition, also the name and residence of its inventor, as well as of its manufacturer and exhibitor. All communications relating to the exhibition should be addressed to "Prof. S. D. Tillman, American Institute, New York." who will furnish copies of the Rules and Regulations adopted by the Board of Managers.

At the opening of the Exposition an address will be delivered by the Hon. HORACE GREELEY, President of the Institute, and a poem by CHARLES G. HALPINE, Esq., (Miles O'Reilly).

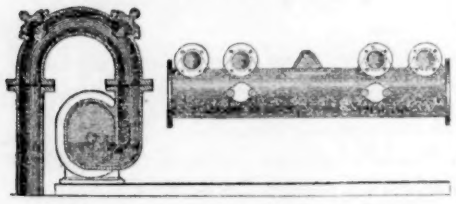
T. B. BYNNER,

IMPORTER AND DEALER IN WATCHES AND JEWELRY, Agent for the AMERICAN WATCH. Also every variety of Swiss and English watches, AT THE LOWEST MARKET PRICES.

189 BROADWAY, NEW-YORK.

Oppsite John Street. 62-85

STANLEY'S
HYDRAULIC GAS MAIN.



WILLIAM TAYLOR & SONS,
COLUMBIAN IRON WORKS,

Nos. 11, 13 & 15 Adams Street, Brooklyn, N. Y.

MANUFACTURERS OF ALL KINDS OF

Castings, Iron Buildings Store Fronts, Columns, Girders and Beams.

ALSO,

Gas Works Castings of all kinds.

Steam Engines, Mill Gearing, Hydraulic Presses for the manufacture of Linseed and Cotton Seed Oils, Sugar Mills, Single and Double Action Pumps, also Steam Pumps, Coal Oil Machinery, High and Low Pressure Boilers, Tanks, Kettles, Soap Curbs, &c.,

MADE AND REPAIRED AT THE SHORTEST NOTICE.

WM. TAYLOR. JAMES A. TAYLOR. EDWIN S. TAYLOR.

PLASTIC SLATE ROOFING
JOINT STOCK COMPANY.

OFFICE 157 [Room 19] BROADWAY,

New York.

W. C. POTTER, Vice Pres't.
J. M. ALLEN, Sec. and Treas. LICENSES GRANTED.

PLASTIC SLATE

FOR

ROOFING & OTHER PURPOSES.

The process of reconstructing Slate Stone from a disintegrated state was

PATENTED FEBRUARY 21st, 1865.

It is a combination of

Pulverized Slate & Viscous Matter,

(the latter possessing qualities of geological and chemical affinity for the former,) and is a development of one of the simple but unalterable tendencies of nature.

As a Roofing Material it Stands Unrivalled.

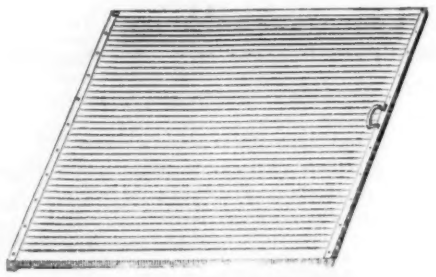
A mastic—it adapts itself to every shape and slope. Non-combustible, impervious, non-expansive, and undecaying.

Frost does not Crack nor Heat Dissolve it.

The only roofing material ever discovered that will resist the action of the elements as long as the structure it protects. Being susceptible of little, if any wear, from exposure, and

Perfectly Fire-Proof,

qualled as a coating for Railroad and Farm Buildings, Fences, Bridges, bottoms of Vessels, Vaults, etc.



JOHN L. CHEESMAN,

MANUFACTURER OF PATENT CONICALLY SLOTTED SOLID WOOD TRAYS.

Two hundred per cent. cheaper than Iron and will last twice as long.

☞ All persons are cautioned against purchasing of any other person. Orders received by mail, or otherwise. JOHN L. CHEESMAN,

147 and 149 Ave. C., New York City.

BAY STATE FIRE BRICK

—AND—

CLAY RETORT WORKS.

CHELSEA, MASS.

DAVIS & CHADDOCK,

MANUFACTURERS.

Office Nos. 125 and 127 Water-st., Boston.

Also agents for the sale of J.K. BRICK & Co's, Clay Retorts, Fire-Brick, Gas-House tile, etc. 66tf

BROOKLYN TUBE WORKS.
B. T. BENTON,

MANUFACTURER OF

WROUGHT IRON AND GALVANIZED

TUBES,

For Steam, Water, or Gas.

MANUFACTORY AND OFFICE,

Corner John and Adams Street, Brooklyn

ALSO

58 John Street New York. 171

Notice to Companies Operating in Lands, Mines, Railroads, etc.

AN ENGINEER AND GEOLOGIST WHO HAS had long experience in the Coal-fields, Collieries, Furnaces, and various descriptions of Mines, and in building Inclined Planes on prominent Railroads of the country, etc., is prepared for an immediate engagement. Can give suitable references. Address

ENGINEER AND SUPERINTENDENT,

Lock Box 40, Richmond, Va,

OREGON IRON FOUNDRY,
738, 740, 742 and 744,

Greenwich Street, New York.

CASTINGS FOR

GAS WORKS

OF ALL DESCRIPTIONS, INCLUDING

Purifiers, Exhausters, Compensators, Self-Acting Valves, Branches, Bends, &c.

FLOYD'S PATENT

Malleable Iron Retort Lid.

SABATTON'S PATENT

Furnace Door and Frame.

REFERS TO—J. A. Sabattan, Esq., Engineer Manhattan Gas Co—Col. A J. White, Metropolitan Gas Co.—C. C. Mowten, Engineer New-York Gas-light Co.—J. Mowten Saunders, Engineer Baltimore Gas Co.—John T. Harrison, Engineer Savannah Gas Co.

136] HERRING & FLOYD, Proprietors

SILAS C. HERRING. JAMES R. FLOYD

JONES & COLLINS'
AERO GAS HEATER BURNER.

Patented 7th August, 1866.

The utility of the article will be at once apparent. It is used chiefly for GLUE KETTLES, HOT WATER BOILERS, OYSTER SALOONS, the SICK CHAMBER, or NURSERY; for JEWELERS, ARTISTS, and PHOTOGRAPHERS. Its perfect combustion, freedom from soot or smoke, GREAT ECONOMY of Gas, and its adaptation to different pressures by its regulating screw, make it a desirable article.

ECONOMY.

In all Wire Gauze and Perforated Heaters, it is necessary to keep a nearly wide open cock, and consequently large consumption of Gas. This burner can be turned down so as to use not more than 1-5th of a foot per hour.

DIRECTIONS FOR USE.

Screw on the Burner as it comes in the package. Light the holes in the dome top. Then, by gradually unscrewing the cylinder from the base, it (the cylinder) is elevated, and the air passages opened, permitting the air to mix with the Gas until the flame becomes quite blue, and combustion perfect.

Burners 2 feet per hour.
" 4 feet per hour.
" 8 feet per hour.

WM. JONES,

19 Washington street, Boston, and 56 Park street, Chelsea, Mass. 176

J. FIRMIN,
Gas Fitting and Plumbing,

Nos. 64 & 66 Maiden Lane, cor. William-st.

Residence, No. 1147 Broadway, near 26th-st.

HOUSES FITTED UP WITH PLUMBING AND GAS WORK IN THE MOST MODERN AND IMPROVED STYLE. SEWERS CONNECTED. BRASS AND LATHE WORK. JOBBING IN ALL ITS BRANCHES ATTENDED TO WITH PUNCTUALITY AND DISPATCH.

GAS BILLS REDUCED.
Gas Lights perfected upon New and Unerring Principles.

REFERENCES:

At A. T. STEWART'S the gas-lights were improved and the gas bills reduced one-third, amounting to several thousands of dollars per year.—A. O. WILLCOX, No. 40 Wall-st.

At the TRIBUNE ASSOCIATION gas bill reduced upwards of one hundred dollars per month, and better lights given.—SAMUEL SINCLAIR Publisher.

At H. B. CLAFLIN'S, late Claflin, Mellen & Co., gas bill reduced—amount not yet ascertained—but it will be at the same ratio, and light improved.—Mr. BANCROFT.

At WM. SCHIEFFELIN & Co.'s, corner William and Beekman-sts., good light obtained and maintained at all parts of the premises, without additional cost—a result despaired of even by the Gas Co. owing to the deficiency of supply. No deficiency by FIRMIN'S system.

Similar results guaranteed under similar circumstances, or NO CHARGE. 65-88

NATIONAL FOUNDRY
AND PIPE WORKS.

Office and Works—Carroll, Pike, Smallman and Wilkins Streets,

PITTSBURGH, PA.

WM. SMITH,

Manufacturer of all kinds of GAS and WATER PIPE, BRANCHES, CONNECTIONS, T's, ELBOWS, and ALL CASTINGS USED AT GAS AND WATER WORKS.

I offer special inducements to parties wishing to purchase, my Pipe is Smooth, regular in weights, and cast vertically.

N. B.—Pipe from 3-inch and upwards, cast in 12-ft. lengths.

☞ SEND FOR CIRCULAR AND PRICE LIST.

149

FOR SALE

THE VALUABLE IMPROVEMENT FOR SAVING and otherwise improving the gas, invented by Dr. J. S. Wood, described in the "Gas-light Journal" October 2d, 1866, is now for sale by State or County rights.

Address J. S. Wood, Patentee, No. 400 Library Street, Philadelphia, Pa.

CHARLES H. REICHMANN,

Manufacturer and Jobber of

LAMPS,

Petroleum Stoves, &c.

AND IMPORTER OF

Porcelain Shades,

WICKS, &C.,

No. 45 Fulton St.,

[Bet. Pearl and Cliff]

NEW YORK.

ALL ORDERS promptly filled for his Patent Petroleum Stoves or Lamp Heaters, which are acknowledged to be superior to any other article of the kind now in use, as regards economy in consumption of oil, as well as simplicity of construction.

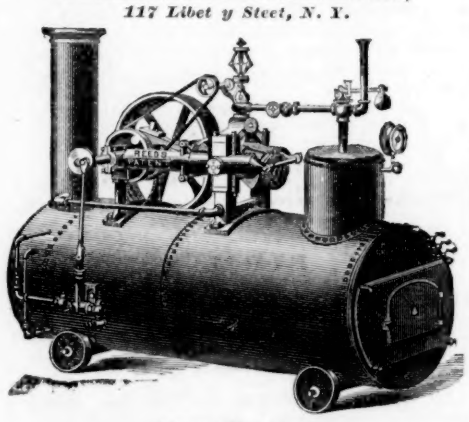
These Cooking Apparatus are used like any coal oil lamp, being provided with a sheet metal chimney, in consequence of which they burn without odor or smoke. They radiate no heat into the room, and are therefore very desirable in hot weather.

Also, Nursery and Night Lamps combined, a superior and cheap article for nursery or sick room; has a kettle, cup and pan, complete.

REED & COGSWELL,

CONSULTING ENGINEERS,

117 Libet y Steet, N. Y.



MANUFACTURERS OF

Slide & Oscillating, Stationary & Portable

ENGINES,

Of all sizes. Also furnish all kinds of MACHINERY, TOOLS, AND GENERAL SUPPLY. Drawings of all kinds of Machinery executed to order.

JOHN A. REED. [63-86] W. B. COGSWELL.

F. H. LOVELL & CO.,

Successors to Alfred Bliss & Co.

MANUFACTURER AND JOBBERS OF

KEROSENE

LAMPS

CHANDELIERS,

BRACKETS,

AND

Lamp Trimmings

GENERALLY.

Station, Sugar House, Street and Coal Oil Lanterns.

No. 233 Pearl Street,

159-182 *NEW YORK.*

Illustrated catalogues and price lists furnished on application.

TURNBULL'S

AUTOMATIC PURIFIER.

STATE RIGHTS FOR SALE ON LIBERAL terms. For further information address by letter, WM. C. TURNBULL, care of T. C. Babcock, 59 Broadway, or to the Editors of this Journal.

EDDY'S

Kerosene Cooking & Heating

STOVES AND RANGES.

THESE COOKING STOVES WILL

☞ *Bake, Boil, Stew, Fry and Roast,*

With the greatest economy and facility, and without heating the room in which they are used. They are perfectly simple, operating like an ordinary Kerosene Lamp with a chimney, and are the only Kerosene Stoves that burn without smoke or odor.

"We have been perfectly astonished to see what a labor-saving, dirt saving and heat-saving institution is EDDY'S PATENT KEROSENE STOVE. Taking the cost of running it, and the result attained, it is the best patent in the market."—*Worcester Daily Spy.*

Our Heating and Cooking Stoves are very convenient and economical, especially where a fire is required but a few hours at a time.

Orders for Stoves may be sent through American Advertising Agency, 389 Broadway, New York.

ALEX. M LESLEY,

Manufacturers, No. 605 Sixth Ave., New York.

Send for Illustrated Circular. (136

KNITTING MACHINES

FOR

Families and Manufacturer,

☞ *Something New and Invaluable for Family Use.*

We offer the public the simplest, strongest and best Knitting Machine in the world.

It occupies but little space—is portable and can be attached to a stand or table, weighs about 40 lbs.

It will knit a variety of Stitches—the breakage of needles is trifling—the cost of needles is insignificant and the most delicate material can be knit pure and spotless, as the needles are not oiled.

Orders for Machines may be sent through the American Advertising Agency, 389 Broadway, N. Y.

Send for a Circular—Agents wanted.

DALTON KNITTING MACHINE CO.,

137] 537 Broadway, N. Y.

WEED'S

HIGHEST PREMIUM

Shuttle Sewing Machine

Has only to be seen and operated to be Appreciated.

Call and see for yourself before purchasing. Please bring samples of various kinds of thread, (such as is usuallg found at stores,) and various kinds of fabric, which you know the former most popular Sewing Machines either cannot work at all, or, at best very imperfectly.

SUPERIORITY.

over any other Machine in the market will be seen at a glance.

1st It runs easily and rapidly, and is so constructed as to endure all kinds of hard usage.

2d. No breaking of threads in going over seams.

3d. No imperfect action of the feed at uneven places in the work.

4th. The Weed-stitch catches of itself, and will sew from the finest lace to the heaviest leather, and 200 cotton to coarse linen thread.

5th. The Weed Machine will do beautiful quilting on the bare wadding, without using inner lining; thus leaving it soft as if done by hand.

6th. The variety of fancy work that can be done on the

WEED MACHINE,

with so little trouble, makes it equal, if not superior, to six machines combined; for instance. it Binds, Hems, Tucks and Sews on the band at the same time, and inf acc, the

WEED NO. 2 MACHINE.

as before stated, is equivalent to a combination of any six ordinary machines.

Orders for Machines may be sent through the American Advertising Agency 389 Broadway, N. Y.

Below we give a few prices:

No. 2. Oil Black Walnut, Ornamented with Hemmer.	$60,00
No. 2. Oil Black Walnut, Hall Case, Ornamented, with Hemmer.	65,00
No. 3. Extra Oil Polished Black Walnut, Half Case, Large Table beautifully Ornamented.	75,00

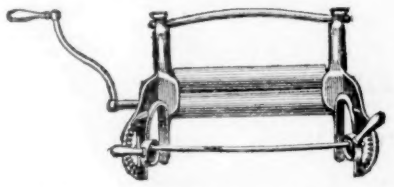
WEED SEWING MACHINE Co.,

136. 506 Broadway, New York

PUTNAM'S CLOTHES WRINGER.

IT IS THE ONLY RELIABLE

Self-Adjusting Wringer.



No Wood-work to Swell or Split. No Thumbscrews to get out of order. Warranted with or without Cog-wheels.

It took the First Premium at Fifty-seven State and County Fairs in 1863, and nearly double that number in 1864, and is, without an exception, the *best* Wringer ever made. Patented in the United States, England, Canada, and Australia. Agents wanted in every town, and in all parts of the world. Energetic agents can make from $5 to $10 per day

WHAT EVERYBODY KNOWS, VIZ.:

That Iron well galvanized *will not rust.*

That a *simple* machine is better than a complicated one.

That a Wringer should be *self-adjusting, durable, and efficient.*

That thumb-screws and fastenings cause *delay* and *trouble* to regulate and keep in order.

That wood soaked in water will *swell, shrink,* and *split.*

That wood-bearings for the shaft to run in *will wear out.*

That the Putnam Wringer, with or without cog wheels, will *no tear the clothes.*

That cog-wheel regulators are not essential.

That the Putnam Wringer has *all* the advantages, and *not one* of the disadvantages above named.

That all who have tried it pronounce it the *best* Wringer ever made.

That it will wring a thread or a bed-quilt *without alteration.*

We might fill the paper with testimonials, but insert only a few to convince the skeptical, if such there be; and we say to all, *test* Putnam's Wringer. Test it *thoroughly* with *any* and any others, and if not entirely satisfactory, return it;

PUTNAM MANUFACTURING CO.—*Gentlemen:* I know from practical experience that iron well galvanized with zinc will not oxydize or rust one particle. The Putnam Wringer is as near perfect as possible, and I can cheerfully recommend it to be the best in use. Respectfully yours,

JOHN W. WHEELER, Cleveland, O.

Many years' experience in the galvanizing business enables me to indorse the above statement in *all particulars.*

JOHN C. LEFFERTS, No. 100 Beekman St.

NEW YORK, *January,* 1864.—We have tested Putnam's Clothes Wringer by practical working, and know that it will do. It is cheap; it is simple; it requires no room, whether at work or at rest; a child can operate it; it does its duty thoroughly; it saves time, and it saves wear and tear. We earnestly advise all who have *much* washing to do, with all intelligent persons who have *any,* to buy this Wringer. It will pay for itself in a year at most. HORACE GREELEY.

PRICES—$8, $9, and $10.

Sample Wringers sent, express paid, on receipt of price.

Manufactured and sold, wholesale and retail, by

PUTNAM MANUF'G CO.,

13 PLATT STREET, New York,

BENNINGTON, Vt.,

CLEVELAND O.

C. GEFRORER,

MANUFACTURER OF

Gas Heating Apparatus

OF EVERY DESCRIPTION,

Gas Burners, &c.

No. 529 COMMERCE STREET,

PHILADELPHIA, PA.

Burners for Wood, Coal Oil and Water Gas.

Gas and Lava Burner Tips

Constantly on Hand.

THE AMERICAN METER CO.

Organized under the General Manufacturing Laws of the State of New York

SAMUEL DOWN, President. HENRY CARTWRIGHT, Vice President. RICHARD MERRIFIELD, Secretary and Treasurer

Trustees.

SAMUEL DOWN, WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, *Superintendent at Philadelphia.*

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. No. 23 West Street, Boston will meet with prompt attention.

Harris & Brother, Practical Gas Meter Manufacturers,

Continue, as heretofore at their old Establishment, No. 1117 CHERRY ST., PHILADELPHIA, to Manufacture

WET AND DRY GAS METERS, and all kinds of GAS APPARATUS, and furnish all articles appertaining to the use of Gas Works. ☞OUR WORK WARRANTED—Satisfaction Guaranteed. Orders respectfully solicted, and promptly attended to, by
HARRIS & BRO., No 1117 Cherry st., Philadelphia.

Messrs. Harris & Brother, Philadelphia Gas Works, February 14, 1857.

Dear Sirs;—I take great pleasure in stating that we have found your meters to register with entire correctness, and to be generally of very good quality—the number furnished by you to these works is over 5,000. John C. Cresson, Enigneer;

Office of the Gas Light Company of Augusta, Ga., March 6th, 1858.

This is to certify that having used meters manufactured by Messrs. Harris & Bro., for the last nine years, we do not hesitate to state they have given entire satisfaction in point of wokmanship and accuracy of registration; they are surpassed by none, and equaled by few manufactories in the Union; we have used meters made by other establishments but our preference is in favor of those made by Harris & Bro., of Philadelphia, Pa.
G. S. Hookey, Superintendent of the Gas Light Company of Augusta, Georgia.

Messrs. Harris & Brother, Philadelphia. Philadelphia, March 4, 1858.

Gentlemen—We take great pleasure in bearing our testimony to the very superior character of the meters we have received from your establishment. We have always found the workmanship all we could desire, while the accuracy and reliability of their measurement have always been satisfactory. We have used meters made by other parties, and none have given as entire satisfaction as those received from you. We are, gentlemen, very truly, yours, Birkinbine & Mears.

Messrs. Harris & Brother. March 14, 1857.

Gentlemen—For the last ten years we have used in the Philadelphia Gas Works, meters made in your factory, and take pleasure in expressing my opinion to their correctness. On several occasions I have taken your meters apart, and found the material used in the manufacture of the same, to be as fine quality as is used in those imported from Europe, or made by any of the manufactur in the United States. Respectfully Yours George Wiegand, Inspector of Gas Fittings, Philadelphia

C. GEFRORER,

MANUFACTURER OF GAS BURNERS,

529 Commerce Street, Philadelphia, Pa.

Burners for Wood, Coal Oil, and Water Gas. Brass and Lava Burner Tips Constantly on Hand.

GROVESTEIN & CO.,

PIANO FORTE MANUFACTURERS,

499 BROADWAY, NEW YORK.

THE ATTENTION of the public and the trade is invited to our New Scale, Seven Octave, Rosewood Piano Fortes, which for volume and purity of tone are unrivalled by any that have hitherto offered in this market. They contain all the modern improvements, French Grand Action, Harp Pedal, Iron Frame, Over-strung Bass, etc., and each instrument, being made under the supervision of Mr. J. H. Grovesteen, who has had a practical experience of over thirty years in their manufacture, is fully warranted in every particular.

THE "GROVESTEEN PIANO-FORTE"
RECEIVED THE HIGHEST PREMIUM AT THE
CELEBRATED WORLD'S FAIR.

Where were exhibited instruments from the best makers of London, Paris, Germany, Philadelphia, Baltimore, Boston, and New York; and also at the American Institute for five successive years, the gold and silver medals from both of which can be seen at our warerooms.

By the introduction of improvement we make a still more perfect Piano-Forte, and by manufacturing largely, with a strictly cash system, are enabled to offer these instruments at a price which will preclude all competition.

PRICES

No. 1,	Seven Octave, round corners,	Rosewood,	Plain Case.	$275
No. 2,	"	"	" Heavy Moulding	300
No. 3,	"	"	" Louis XIV style	325

a fac-simile of the accompanying cut.

TERMS—Net Cash, in current funds Descriptive circular sent free on application.

MORRIS, TASKER & CO.,

PASCAL IRON WORKS

[ESTABLISHED 1821,]

PHILADELPHIA,

Manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues, GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

Gas and Steam Fitters' Tools, &c.

STEPHEN MORRIS,
THOMAS S. TASKER,
CHAS. WHEELER,
STEPHEN M. P. TASKER.

J. VAUGHAN MERRICK, W. H. MERRICK,
JOHN E. COPE.

SOUTHWARK FOUNDRY,

FIFTH & WASHINGTON STREETS,

PHILADELPHIA.

MERRICK & SONS, Engineers,

MANUFACTURERS OF EVERY DESCRIPTION OF GAS MACHINERY.

Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gasholders, either Telescopic or Single, with Suspension Frames complete; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron, Line Sieves for Purifiers, Hoisting Machines for Lifting Purifier Covers.

Address— MERRICK & SONS,
5th and Washington Sts, Philadelphia.

S. FULTON & CO.,

(Successors to Colwell & Co.)

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heavy & Light Castings of every description, No. 207 North Water street and 206 North Wharves, Philadelphia.

SAMUEL FULTON, THEO. TREWENDT

TO GAS COMPANIES.

THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

CHAS. M. CRESSON,
Late Asst. Engineer of the Philadelphia Gas-works
417 Walnut st., Philadelphia.

POOLE & HUNT,
BALTIMORE, MD.,
are prepared to execute orders for
GAS-HOLDERS,
IRON-ROOF FRAMING,
And other descriptions of
Iron Work for Gas-Works, Water-Pipes, and Heavy Castings, and Machinery generally.

GEO. H. KITCHEN & CO.,

NEW PATENT

GAS APPARATUS

For Country Residences, Public Buildings, &c.,

FROM $300 UPWARDS.

EVERY DESCRIPTION OF GAS FIXTURES.

Gas Fitting in all its branches

561 Broadway,
NEW YORK.

THE WOODWARD
Steam Pump Manufacturing Company,

MNUFACTURERS OF THE WOODWARD PATENT IMPROVED

SAFETY STEAM PUMP,

—Adapted for Mining and Fire Purposes—and
Steam, Water & Gas Fittings of All Kinds.

Also, Wholesale and Retail Dealers in WROUGHT IRON PIPE, BOILER TUBES, etc.,

Woodward Building, 76 and 78 Centre Street,

corner of Worth street,
Formerly 77 Beekman Street, *New York.*
58 GEO. M. WDDOWARD, Pres't. 64

JOSEPH LENNIG,

1615, 1617, and 1619 Francis St.,

Above Ridge Avenue, Philadelphia, Pa.,

MANUFACTURER OF

Wet and Dry Gas Meters,

STATION, SHOW, & EXPERIMENTAL METERS,

Photometers, Pressure Registers, Indicators, and Gauges, Governors, Meter Provers, Centre Seals, Fluid Gauges, &c.

GAS APPARATUS

Of the most reliable and approved construction manufactured and on hand at the

UNION GAS METER WORKS.

D. PARRISH, Jr.,

GAS ENGINEER

And Contractor for Coal or Oil Gas-Works.

Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.

205 1-2 Walnut st., Philadelphia, Pa.

Box 1956, Post Office.

To Manufacturers of Petroleum Gas.

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

Apply at the Gas-Works of St. Nicholas Hotel, No. 63 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

SAVING OF FUEL TO PARTIES USING STEAM.
DAMPER REGULATORS.

Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 117 Broadway, New York.

THE AUBIN BALLANCED

VALVE WATER METER,

(Used also for Oils and Liquors)

Is now in use by many City Water Cos., because of its low price, simplicity, durability, accuracy under any pressure, and (a great advantage) because it runs with less head than any meter used. Manufactured by H. Q. HAWLEY, Albany, N. Y.

WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.

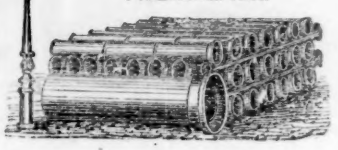
J. D. WEST & CO.,
No. 40 Cortland street,

R. D. WOOD & CO.,

MANUFACTURERS OF

CAST-IRON PIPE, RETORTS, &c.

Office, 400 Chestnut Street,
PHILADELPHIA.



Great Improvement
IN
Sewing Machines.
EMPIRE
SHUTTLE MACHINE!

Patented February 14th, 1860.

Salsroom, 536 Broadway.

This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

It has a straight needle, perpendicular action, makes the LOCK or SHUTTLE STITCH, which will NEITHER RIP nor RAVEL, and is alike on both sides; performs perfect sewing on every description of material, from Leather to the finest Nansook Muslin, with cotton, linen, or silk thread, from the coarsest to the finest numbers.

Having neither CAM nor COG WHEEL, and the least possible friction, it runs as smooth as glass, and is

Emphatically a Noiseless Machine!

PRICE OF MACHINES,

COMPLETE:

No. 1, Family Machine, with Hemmer, Feller, Gauge, Braider, & Corder, complete. - - - $60
No. 2 Small Manufacturing, with Extension Table, $75
No. 3. Large Manufacturing, with Extension Table, $85
No 3. Large Manufacturing, for Leather, with Rolling Foot and Oil Cup, 100

One-half hour's instructions is sufficient to enable any person to work this Machine to their entire satisfaction.

Agents Wanted in all Towns in the United States, where Agents are not already established. Also, for Cuba, Mexico, Central and South America, to whom a liberal discount will be given Terms, invariably CASH on delivery.

T. J. McARTHUR & CO.,
536 Broadway.

GAS-BURNERS.

WIGHTMAN BROS.,

IMPORTERS AND

SOLE AGENTS

For the United States and Canada, of

SCHWARZ'S

GERMAN LAVA GAS-TIPS

And proprietors of Winchester's Improved

LAVA TIP GAS BURNERS,

No. 25 Kilby Street,

BOSTON, MASS.

T. G. ARNOLD,

MANUFACTURER OF

GAS-BURNERS,

And Importer of SCOTCH TIPS,

224 and 226 West 21st street,

formerly No. 447 BROOME ST., New York.

Mercury Cups, Portable Sockets, Burner Pillars, Burner Pliers, &c., &c.

C. GEFRORER,

Manufacturer of

GAS-BURNERS,

For Lighting and Heating Purposes.

GAS HEATING AND COOKING APPARATUS; FITTERS' ROVING APPARATUS, &c.

529 Commerce st., bet. Market & Arch, Philadelphia

JOSEPH LEES,

Sole Agent for the sale of

Thompson's Gas Controller

in the States of

CALIFORNIA AND OREGON,

San Francisco, Cal.

Carrington & Co.'s
GENERAL
PURCHASING
AGENCY,
In Connection with all the Expresses
No. 30 Broadway,
NEW YORK.

Estabished 1854.

Purchases to order any article wanted from New York, or Europe, for ladies' or gentlemen's use or wear,---comfort or luxury,---from a cameo to a cashmer, a seal ring to a steam engine.

Goods purchased at current City prices, and forwarded by Express or as directed.

Commission, Five Per Cent

Remittances, with orders, can be made by Express if preferred, as all Express Agents will take orders, receipt for and forward funds, and see to return of Goods.

THE HAVANA
MEXICAN & BRAZILIAN
EXPRESS.

CARRINGTON & CO.
30 Broadway.

Express for HAVANA and ISLAND OF CUBA by regular steamships weekly.

Express for MEXICO and VERA CRUZ on the 10th and 16th of every month.

Express for ST. THOMAS, BAHIA, and RIO DE JANEIRO each month.

Packages received for United States Brazil Squadron.

Freights should be sent to our office day before sailing of steamer, with invoice, contents and value.

FINKLE & LYON'S
New Family
SEWING MACHINE

Should be known in

IN EVERY TOWN.

To accomplish this at once and save the expense of a *Travelling Agent*, we offer thus, viz:

Any one sending us orders for two machines shall receive one machine free of charge. This proposition cannot avail after we have appointed a local agent in the town.

We have now completed our *new manufacture* at a cost of some $200,000—introducing *new patents*, and such important improvements, that without fear we are able to offer the following stringent guarantee, viz: After a fair trial, if any purchaser does not prefer the FINKLE & LYON FAMILY SEWING MACHINE to any other, he can return it and have back his money.

This machine has taken many of the HIGHEST PRIZES; *is less complicated than any other first class machine; does a wider range of work without changing; requires no taking apart to clean or oil, no "lessons" to set needle, regulate tension or operate machine.*

Our new Manufacturing Machine is sold on the same terms as the Family Machine.

Please send for a circular with samples of sewing.

Finkle & Lyon S. M. Co.
No. 581 BROADWAY, NEW YORK.

Etna Gas Stoves.

The desire mankind have for cleanliness, economy and comfort, is exemplified in the numerous devices that are brought before the public for utilizing gaseous fuel for heating and cooking purposes.

The first desideratum in an apparatus for this purpose is to perfectly consume the gas and prevent smoke or odor; also to radiate the heat to the best advantage for heating purposes.

The first engraving represented herewith, shows the gas stove with the burner enclosed. The apparatus for cooking in its various forms is placed upon this. It is also constructed to receive a heating drum as shown in figure 2, for heating rooms, offices, etc.

It is asserted that the improved Etna burner, shown in figure 3, burns the gas perfectly and entirely, producing one-third more heat from the gas than the common gas stove, without unpleasant smell or odor, and that it will not draw down and smoke, that is, take fire at the bottom where the gas is. This is an important improvement, for gas burning at low pressure is quite liable to ignite below as well as above. The result is imperfect combustion and the evolution of a carbonic oxide gas, which has not only a very disagreeable odor, but is positively unhealthy and even dangerous, if breathed for any length of time in a close apartment.

This burner is simply a tube of tin or sheet iron, having at the top a hoop or band of perforated tin enclosed in two convex cast iron cups, which do not quite come together, secured by a central pin or screw, and which project so as to leave an annular chamber all around the perforated hoop of tin. Here and in the tube below the air or gas become fully combined to produce perfect combustion. The tube is set over any gas pipe or jet, which is to be regulated by a stop-cock as usual. This is T. J. Kelly's patent of November 14th, 1865. The stoves are lighted instantly by turning a thumb-screw, and extinguished in the same manner when the cooking is done. The expense of burning is about the same as a six-foot burner for lighting.

The cost of cooking a breakfast is said to be about the price of a bundle of kindling wood to light a coal fire; but also saves the expense, inconvenience, trouble, dirt and uncomfortable heat of a coal fire, and the time required to start it, and the loss after using it before it can be extinguished.

These stoves are furnished of three sizes, at $2.60, $3.50 and $7.50, according to size and capacity. Messrs. Moore & Nichols manufacture and supply these useful articles at No. 45 Dey street, N. Y.

Fig. 1.

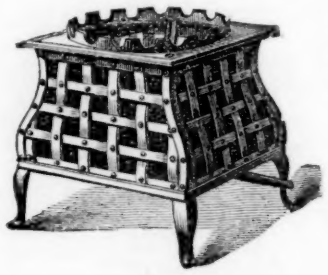


Fig. 2.

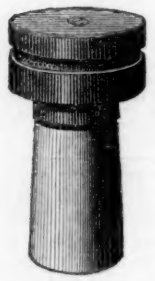


Fig. 3.

ETNA GAS STOVES.

Peat for Gas.

[From Leavitt's Peat Journal.]

In a former issue we gave a description of the Buckland Peat Machine, known also as Brunton's, concerning which, we stated that it produced an excellent article of fuel, but at too great cost for operating it, to admit of its general use.

We have been shown the following statement from an engineer and chemist of considerable note, to Mr. Brunton, concerning the uses and value of the fuel:

"I have great pleasure in expressing to you my conviction that peat, if properly treated and prepared is a most valuable material for gas purposes; and that by the introduction of peat into gasworks, a very considerable saving must be effected. This, my conviction, is based partly upon the experience of others, partly upon my own experiments. Peat, in its natural state, merely air dried, has been worked for gas with satisfactory results, both in this country and abroad: and although its use has been discontinued in many places, this is owing only to the difficulty of collecting and drying quantities sufficiently large for the consumption, or, in other words, to the want of a proper supply, inasmuch as the gasworks could not hitherto buy the article in the market, but were obliged to supply themselves with it. As an instance, I may state some information received from Mr. H. Watts, engineer of the Dartmoor Goal, who writes me that the prisons have been lighted with peat gas from October 1852 to August last, since when coal has been used with peat, in consequence of the wet weather during the last season preventing a sufficient supply being obtained, and that, in his opinion, the illuminating power of peat gas is quite equal to the best coal gas. I had occasion to fully investigate this question myself some time since, while determining the value of some Scotch peat on the works of the Commercial Gas Company, Stepney. A series of experiments, as reported on to Mr. Robert Jones, engineer of this company, gave me the following results: One ton of peat yields—

Gas equal to 16½ sperm candles: 13·160 cubic feet.
Coke, 762 lbs.
Tar, 82½ lbs.
Liquor, 86 gallons: containing Ammonia, 4·25 lbs.
Acetic Acid, 5·2 lbs.
Wood Spirits, 6·7 lbs.

"I must state that this peat was of a very superior quality, and was dried only in the open air. It still contained 9·3 per cent. of moisture; but, on being burnt, it left only 2·2 per cent. of ashes. Its specific gravity was equal to ·810. It might have been anticipated that in comparing the results obtained from peat and coal, some advantages as well as some disadvantages, would be found in the working of each of them which I now briefly state.

"Peat is converted into gas in a much shorter time than coal, effecting thereby a considerable saving in labor and expense. The percentage of sulphur in peat is much smaller than in coal; in fact, peat from many, if not from most localities, is perfectly free from sulphur. Now, as the separation of sulphur compounds from gas is absolutely necessary, the purification of peat gas will be, in this regard, effected in a simpler and cheaper manner than that of coal gas. One disadvantage in working peat is, that a much larger quantity of carbonic acid is produced, which, if not perfectly removed, would seriously injure the illuminating power of the gas. A larger quantity of a suitable compound to absorb and retain this gas, must be employed in consequence; the expense of which, however, will be more than counterbalanced by the above advantages. Another and far more serious disadvantage shown by my experiments, is the little or no value of the resulting coke. The coke, on being withdrawn from the retorts, was so light and porous as at once to burn to ashes. This last point, then, leads me directly to a consideration of the peculiarity of your patent process for treating and preparing peat. The only true obstacles which I can find against the permanent application of peat for gas purposes, are, firstly, the difficulties of sufficiently drying the peat; because any large amount of water must have a most destructive action upon the light-producing compounds of gas; secondly, the smaller value of the coke as obtained from ordinary peat. Both these difficulties are, in my opinion, removed by your patent process, which, in a simple and most efficient manner produces a peat containing considerably less water than any coal, and which, at the same time, condenses the peat so much that the coke obtained from it is of the most dense and compact nature, resembling much more wood charcoal in its outer appearance and in its properties than common coke.

"I should have wished to be able to record the results of some actual experiment made with peat prepared by you; but as the time for doing so has not yet arrived, I must be satisfied with stating the specific gravity of three samples of prepared peat received from you, which will most strikingly indicate the effect of your condensing process. The specific gravity of ordinary peat, however well dried, seldom surpassess .800, but the samples received from you were as follows:

No. 1..... 1·51
" 2..... 1·20
" 3..... 1·15

I therefore consider your process of the utmost importance, and I have great pleasure in expressing my sincere wish that you may succeed in producing the peat at such a low price, as to induce the gas companies, at least partially, to substitute the coal by your prepared peat. It is my firm belief that your process, if sufficiently supported and effectively carried out, will at no distant time materially influence the art of gas manufacture of the present day.

Fred. Veesmann, F.C.S.,
Consulting Engineer and Analytical Chemist.

The Avitor, or Flying Machine.

For some time past this new feature of aerial navigation has been going the rounds of the press, and public opinion decided it would be a failure. The following, taken from the San Francisco *Daily Call* will remove all doubts respecting its failure:

"The public has come to believe that the Avitor, or flying machine experiment has been given up by its originators. A circular at hand shows that such is not the case, but that on the contrary the company is sanguine of success. A distinguished and practical mechanician and engineer of this city, (George K. Ginyas,) says in the circular that the machine generally, its machinery and the principle of its construction, are perfect, but there is "needed greater capacity for holding of gas, and a modification of the machine, to enable it to be compressed that the gas-holder may the more readily be filled with pure gas. The arrangements for controlling and managing the different portions of the machine could not be better; the engine I think adequate to perform all the services required of it.

As to the probable velocity of the Avitor I would say nothing. Once afloat, and I can see nothing to hinder its floating; it is merely a question of resistance. For an invention so novel, the Avitor has met with comparatively few practical obstacles; and when it is remembered that the difficulties in the way of Fulton's experiment were much greater than those that have kept back the Avitor, and that the principle is in both cases equally sound, it will be seen that there are good reasons for the belief that the machine, with the modifications referred to, will yet successfully navigate the air." Mr. Peter Donahue has personally observed the construction of the machine, and says.: "I am so thoroughly convinced of the practicability of the enterprise and so entirely concur in the foregoing observations respecting the two modifications to be adopted. that I have no hesitation in saying that when these changes are made, the Avitor will answer all the purposes of its inventor, and fully realize the expectations of the public. As soon as the elevating power shall, in this way, have been perfected, the work will be completed, because the propelling force is ample, the machinery for elevating and for depressing sufficient, the steering apparatus in fine working order; and, in short, the whole of the Avitor is fully under the control of the operator." We earnestly trust, and have reason to believe, that the affair will prove a success."